



FRIDAY, MAY 10, 1901.

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Contributions

Concerning Exposition Rates.

TO THE EDITOR OF THE RAILROAD GAZETTE.

... I have no hesitation in saying that I think this [Railroad Gazette, May 3, "Concerning Exposition Rates"] is the best article on the subject of passenger fares that was ever written by one who is not an experienced passenger man. It outlines more clearly than I could do, the difficulties under which the few conservative railroads in the country are laboring, because of the willingness of the majority of the railroads to make nominal rates for the transportation of passengers when the slightest excuse therefor is offered.

What you say with reference to Pan-American rates, it would not be well perhaps for a railroad passenger man to indorse openly, but it is certainly a very clear and common-sense view of the situation. ... The fact that one who is not concerned in details of passenger traffic should, in an editorial, indicate such a clear insight into the difficulties from which we are suffering to-day, must have good effect. ... G. P. A.

Below are some extracts from letters received from other General Passenger Agents:

The subject of this article is so broad that it might be made the basis for a very strong discussion with many arguments for and against the general proposition you have so broadly considered. I have read the article with a great deal of interest and to a great degree believe that your position has many arguments to commend it.

I am in full accord with many of the ideas expressed. We have endeavored to put every restriction around our special rate tickets to Buffalo in order that our regular local business may be protected to as great an extent as possible. You will appreciate, however, that this would be easier if the ticket scalper were eliminated from the question. With the scalpers out of the way, the railroads would be glad to grant much more liberal conditions in the issue and sale of special rate tickets on account of expositions, association meetings, etc. It is also a fact that transportation lines are the only concerns that really make reductions on account of occasions of this character. The living expenses at hotels and private houses are very considerably increased under such conditions, and it is generally impossible to obtain a reduction in the cost of any commodity except travel.

I have read the article carefully several times. You have made no mistakes, either of fact or of judgment. It is an article that will be appreciated by conservative men, and, I trust, will have its effect on those who have been so anxious to put in special low rates. I am satisfied that the attraction of the Buffalo Exposition will be of such a character as to bring out a very large travel even at our regular rates. We shall do our best to keep them up and prevent any break from any section of the country wherein we are interested.

I unhesitatingly pronounce your conclusions sound and well formed from a revenue standpoint. While the entire passenger fraternity of the country may not

indorse your conclusions, the article, I am sure, will stimulate a sentiment against a radical reduction in rates for the movement of large bodies and the adoption of unremunerative rates for special occasions.

The Eastern Terminus of the Chinese Eastern Railroad.

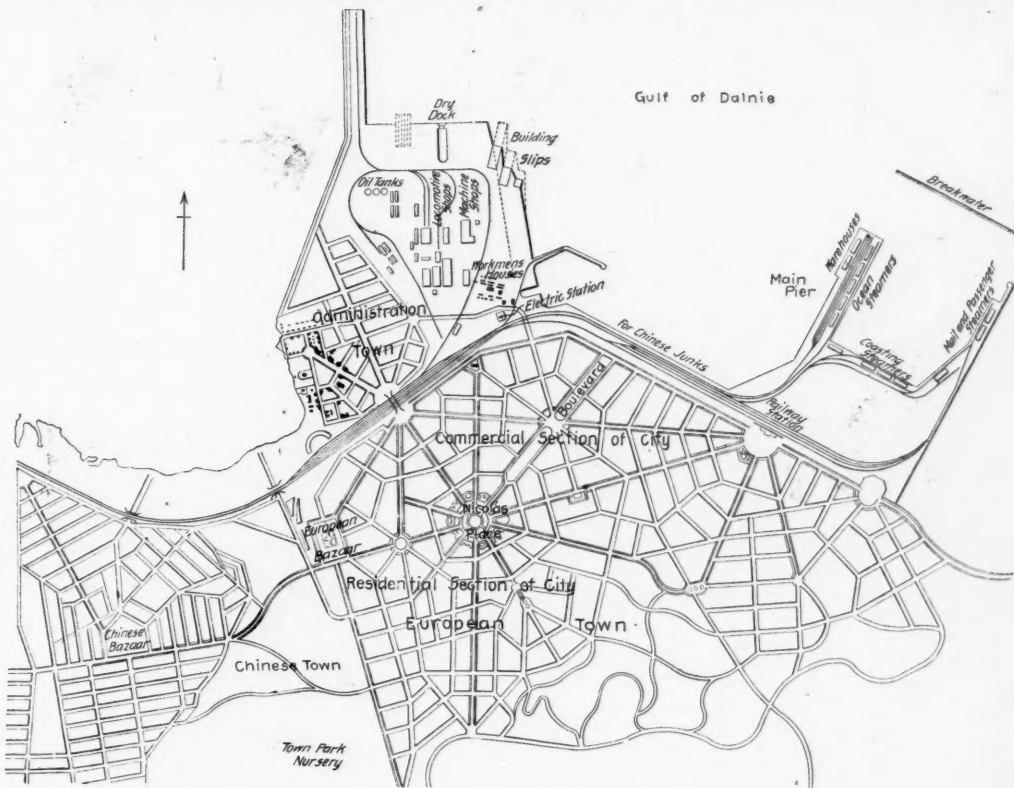
Although much has been written about the great Siberian railroad and still more in regard to its effect upon the commercial geography of the world, very little attention has been paid to the great work which is now being undertaken by the Russian Government in the construction of a southern terminus for this road. The ordinary observer is led to believe that this terminus is to be Port Arthur, but in reality it is to be at a point some 40 miles east of that town, where conditions are much more favorable for the development of a great commercial city.

The search for a suitable location for such a city began almost immediately after the conclusion of the China-Japan war, when Port Arthur was leased to Russia by China. At that time Dalmie was a little Chinese fishing village lying peacefully on the shores of Talien-wan Bay. It had no harbor, aside from a very insignificant inlet, but the water about its shores was deep and the bottom firm and hard, though not rocky. Moreover, the hills

struction but it has since been resumed as energetically as ever.

The plans contemplate the laying out of a city approximately three miles long and a mile and a half wide. This city is to be divided into four towns, the commercial town, the European town, the Chinese town and the administration and manufacturing town. The administration town is separated from the other towns by the railroad, the Chinese town is cut off from the rest by a park and nursery, and the European town is divided from the commercial town by a broad boulevard running in an easterly and westerly direction through Nicolas Place, the great central square of the city.

In detail the plan of the city is unlike anything we have in America. It resembles more closely Paris or Versailles, being distinctly French in design. The streets are not laid out at right angles, one to another, but radially from various centers or squares—the chief of which is Nicolas Place. Facing this imposing square are to be the various important buildings of the city—the court house, the banks, the municipal buildings, the post and telegraph offices, the police and fire departments, the opera house and other edifices of prominence. From the square running to the water and so laid out as to extend toward the highest and most beautiful mountain of the landscape, is a broad and spacious boulevard, the most imposing highway of the town. All the principal avenues radiate from Nicolas Place. It is the nucleus of the whole city.



The Deep Water Terminus of the Chinese Eastern (Manchurian) Railroad, Dalmie, Near Port Arthur.

which skirt the shore for hundreds of miles along this coast at this point are broken, leaving an area of comparatively level land sufficiently large to be the site of a great commercial center. Water was abundant, evidences of coal had been found in the immediate vicinity and behind the surrounding hills were large areas of land already partially cultivated and capable of furnishing food for a vast population.

The Russian Government did not rush into the building of the city of Dalmie with undue haste. For over two years the engineers, working in conjunction with the officials of the Chinese Eastern Railroad (a branch of the Siberian Railroad) made extensive researches and investigations. Newchwang was then the commercial terminus of the road and there was serious opposition to the building up of a new center of industry which might draw trade away from the port already established. It was recognized, however, that Newchwang was 200 miles further north than Dalmie and it was also recognized that it was eventually Chinese not only in its government but in its feelings and sentiment, and that it would, in consequence, be far more difficult to control in case of controversy or trouble than a new city of Russian design, built by Russian hands and settled solely by subjects of the Czar.

After it was decided that the new Dalmie should be, there was no delay in undertaking the stupendous task of getting the work under way and of pushing it toward completion. The management of the whole enterprise was placed in the hands of Mr. V. V. Sacaroff, an engineer of recognized ability who had had much experience in work of a similar nature at Vladivostok. He immediately gathered about him a large staff of able assistants, prominent among whom was Mr. George Lees, a Scotch engineer, and the only foreigner connected with the undertaking. The plans being well under way, actual construction was begun in the summer of 1899, and for the first 12 months between 5,000 and 10,000 men were continuously engaged in the work. When the trouble in China arose there was a slight let-up in the work of con-

In the administration and manufacturing town the greatest amount of work has already been done. The residences are all completed. Machine shops, carpenter shops, smith shops, a dry dock and several other structures are practically in running order, while an electric station, of capacity great enough not only to supply electricity for lighting the city, but to run its street cars, operate the dry docks and propel much of the manufacturing machinery, is well under way.

The railroad runs from the outskirts of the city, through a cut past the manufacturing town down to the water front. From it various sidings are to be laid so that this section of the city will have ample transportation facilities for its products. The chief industry of the city is to be the building of locomotives and trucks for the railroad and of steamships and other vessels for the water connection. These shops are very comprehensive in scope, the plan being to provide them not only with facilities for turning out rolling stock of the very highest grade, but also for making boilers and engines for the steamships, and other machinery as well. They are to be operated entirely by electricity furnished from the electric station.

The ships referred to are to be built in slips located not far from the locomotive shops. These slips are to be of ample size for the construction of ocean-going liners, and it is contemplated to construct and place in service as soon as the Siberian railroad is completed a line of first class steamers to ply between Dalmie and Vancouver, stopping at the principal ports on the way. Already there is operated from Port Arthur in conjunction with the railroad a line of steamers which coast between the main ports of the Far East, but the Russian Government is not content to limit its connection with Asia. It means to have a direct line from St. Petersburg to the Continent of America.

It is to provide for the harboring of this fleet as well as to make easy the loading and unloading of these and foreign vessels that the harbor and docks of Dalmie are being built. The harbor is to be an entirely artificial one. It is to be made by running two piers out into the bay at

right angles to the shore, these piers being about a half mile apart and each about 3,000 ft. in length. The mouth of the harbor is to be closed by means of a breakwater running at right angles to the piers and so placed that only openings large enough for the free passage in and out of vessels will be maintained.

On the shore the piers are to be connected by a bulkhead in order to insure deep water at every point within the harbor.

In considering their construction the piers may be divided into two sections. That section running from the old shore line to a point about 200 ft. inside of the bulkhead is being made by filling in with rubble stone the space between two rows of closely driven and strongly anchored piles. The section beyond that is being built entirely of concrete blocks made on the shore in the immediate vicinity and put in place by a specially constructed traveling crane. These concrete blocks are said to be larger than any ever before used in similar work. They are made by binding together pieces of magnesian lime-

The Ventilation of Elkhorn Tunnel—Norfolk & Western Railway.

BY CHARLES S. CHURCHILL, *Engineer M. of W.*

The Norfolk & Western Railway, by means of the Elkhorn Tunnel, crosses the Flat Top Mountain in McDowell County, West Virginia. This mountain forms the divide between waters flowing into New River on the east, and those flowing into the Ohio River, by way of Elkhorn Creek and the Big Sandy, on the west. The tunnel is about 3,000 ft. long, and the elevation of its eastern end is 2,386 ft. above tide. The famous Pocahontas coal bed extends through the mountain at the same elevation as the tunnel, and its outcrop, which is about 11 ft. thick, can be seen at both east and west portals.

The grade in the tunnel corresponds to the average dip of the coal bed to the west, which is at this point 1.4 per cent. The approach to the tunnel from the west is an up grade of 2 per cent. for several miles, reducing at the west portal of the tunnel to 1.4 per cent. This latter

tunnel before its ventilation became at times very warm, and the conditions to which the trainmen were subjected were, to say the least, unpleasant. The use of heavier engines, and the increasing number of trains, added further to the unsatisfactory condition, and the thorough ventilation of the tunnel became a matter of the highest desirability.

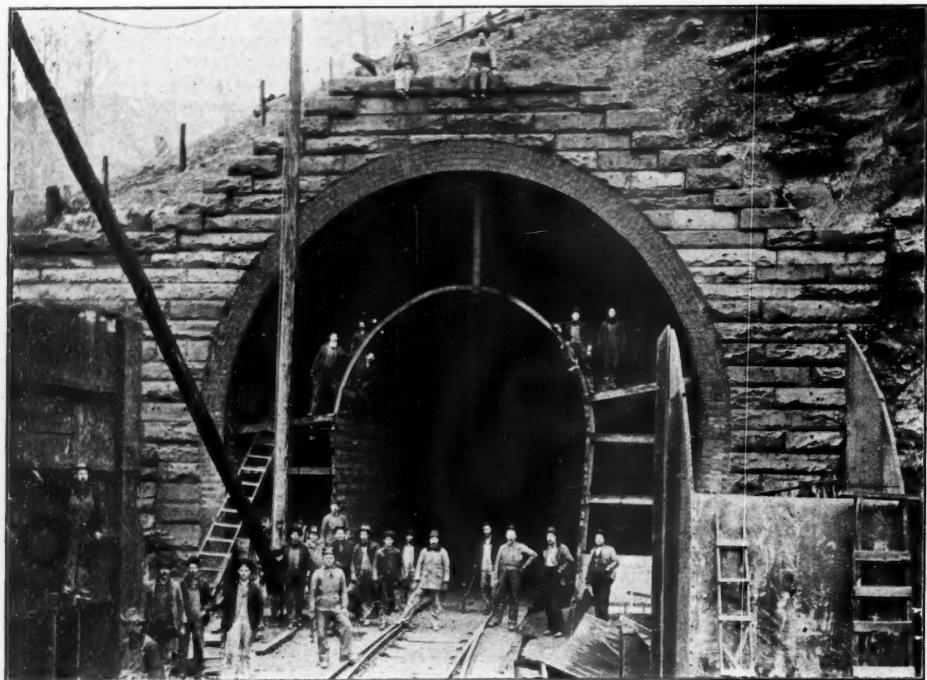
At present the number of two-engine eastbound trains is about 18 in 24 hours, and of three-engine eastbound trains about 39; the total number of all movements through the tunnel, both east and westbound, being about 92. Eastbound trains, several in number, frequently stand to the west of the tunnel, and follow each other through the tunnel as quickly as they can get a signal that the train ahead has passed out of the block near the east portal.

Notes taken of the condition of the air in the tunnel prior to its ventilation showed that in summer 17 to 55 minutes was required to give it time to clear after the passage of a train. The shortest time noted was in winter, when the average time was about 20 minutes, though frequently much longer. Each train had then generally not only its own smoke to contend with, but that of one or more previous trains. The temperature inside the tunnel became about 30 deg. higher than the outside temperature on the passage of a train.

The ventilation of the tunnel has been under consideration by the management of the railroad for some years. The usual plans were gone over but were not carried into effect because it did not appear that relief would be afforded by them; the most promising also involved a decrease in the cross section of the tunnel, which was of itself none too large, or else movable screens or doors. It was practicable to locate a shaft and fans about 1,000 ft. from the east portal, but there seemed to be no certainty as to how the resulting air currents would travel, except that a train on one side of the shaft would cut off the current on that side, thus receiving no relief. The best that could be done would be to clear the tunnel after a train in a somewhat shorter time than before, but no relief would be afforded to a train from its own smoke, heat and gases. If air had been drawn from this shaft, as is sometimes done, or forced into it, it would have been necessary to reduce the cross section of the tunnel on the west side of the shaft in order to make the resistances as near equal as practicable on each side, which reduction was very objectionable.

The method employed at the Pracchia tunnel in Italy was finally noted in the engineering journals. This consists in forcing air in at one end of the tunnel by an injector, formed by enclosing the area between the outline of a train and the walls of the tunnel, as a passage way through which the air is forced. This necessitated a reduction in the area of the cross section of the tunnel at this point in the Pracchia design; but on careful investigation it was found that the force of a blast could be fully utilized without this reduction of area. This problem was worked out generally, and then applied to the conditions existing at the Elkhorn tunnel. Full detail plans were prepared on the calculated lines, and the work was executed in the spring of this year. The engravings show the general plan and some details.

In the design it was considered that while a quick clearing of the tunnel after the passage of a train would be desirable, it would not be sufficient; but that each engineman should be protected as far as practicable from the smoke and heat of his own engine. The plant was, therefore, placed at the west portal, and a blast was



Portal of Elkhorn Tunnel, Norfolk & Western—During the Building of the Ventilating Plant.

stone, varying in size from 4 to 12 in., with a mortar consisting of three and a half parts of fairly clean sand and one part of Russian Portland cement. The blocks when finished are approximately 14 ft. x 8 ft. x 6 ft. and weigh nearly 50 tons. They are moved from their position after seven days and placed on a stock pile where they remain until they are put in place on the pier by the before mentioned crane. Samples of the cement are tested frequently in the government laboratory. Very few of the ordinary tests for tensile strength are made, but tests for expansion and stability are conducted with great frequency. A rather unusual test which is regularly employed consists of making a briquette half of cement mortar and half of a piece of limestone, so shaped as to fit the mould. After seven days the adhesion of the two materials is tested in an ordinary tensile strength machine. The uniformity of the results of these tests was remarkable.

The breakwater is also built of concrete, the blocks being put in place by cranes placed on barges. The construction of the harbor is about one-third done. It is expected that it will be completed within a year.

The facilities for handling material from the vessels to the piers will be exceptionally good. The main pier, which is 450 ft. wide for two-thirds its length is supplied with eight tracks, two of which run close to the edges of the piers so as to make it possible for material to be transferred directly from the ships into cars, or vice versa, if desirable. The other tracks run alongside warehouses which are to be built the entire length of the structure. For a distance of 2,000 ft. from the end of the main pier the water is 28 ft. in depth. Here it is proposed to handle the material from the big freighters. The water alongside the other pier is equally deep. Here it is proposed to handle the passenger traffic and the great ocean liners. The water at the bulkhead will never be less than 18 ft. and here it is proposed to handle the smaller coasting craft. The Chinese junks are to be tied up along a bulkhead connecting the main pier with the manufacturing town. Here the water will always be at least 9 ft. deep.

This roughly is the plan and scope of the new city and port of Dalmie. If Corea ever becomes Russian territory the whole undertaking will probably be abandoned for a more favorable location in one of the natural harbor towns in the southern end of that peninsula, but as long as the Hermit Kingdom remains independent Dalmie will continue to grow until, when the Great Siberian Railroad is in full running order, it will assume the guise of one of the great ports of the Far East.

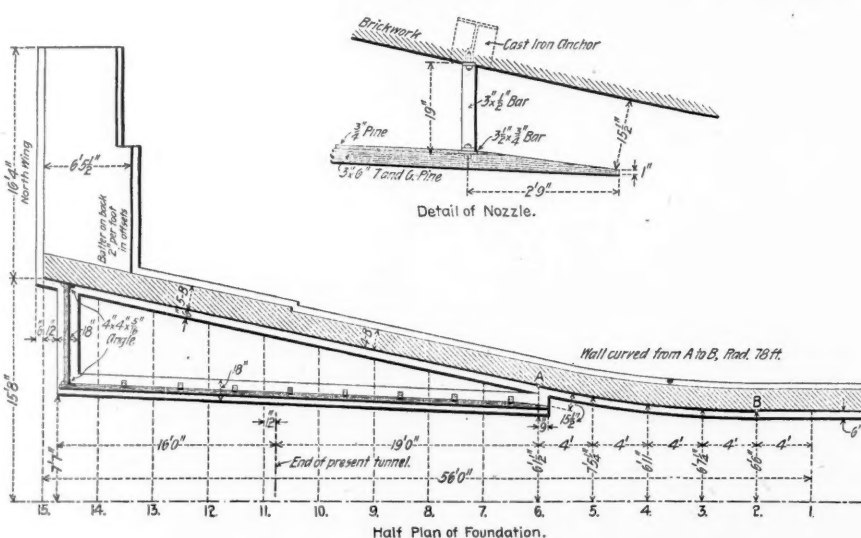
JASPER WHITING.

Shanghai, Dec. 7, 1900.

grade extends through the tunnel without break to the summit, which lies a few hundred feet east of the east portal.

The tunnel is lined with brick throughout, and is built for single track, although since its construction the road has been double-tracked on both the east and west.

While a large tonnage of coal is mined from the Pocahontas bed on the east of the Elkhorn Tunnel and shipped to tidewater, still there is a considerable percentage mined in the Elkhorn Valley on the west and also shipped to



Injector for Ventilating Elkhorn Tunnel.

Lambert's Point, Norfolk. This latter coal is hauled up the adverse grades, and through the tunnel either by two heavy engines weighing each 133 tons with tender, or by three of ordinary weight to each eastbound train of about 1,200 tons. If two engines are used one is placed at the head of the train and one in the rear. In case three engines are used one is placed at the head of the train, one near its middle, and one in the rear.

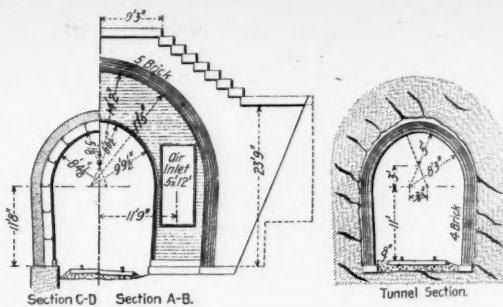
Considering the adverse grades to eastbound trains, and the number of engines used to a train, the amount of smoke and gas emitted by one train is very great. The

planned sufficient in amount to drive the smoke ahead of each eastbound engine, instead of trailing into its cab as had happened in the past; eastbound trains in this tunnel being the only ones emitting any considerable amount of smoke.

The machinery of this ventilating plant consists of two fans, 14 ft. in diam., each operated by an engine of 75 h.p.; the number of revolutions per minute, which delivers air at 1 ounce pressure at outlet of fan, being 118, and the rated delivery at this speed being 168,558 cubic ft. per minute per fan.

On April 10, 1901, before the plant was entirely complete, some preliminary tests were made. These two are a fair average of results: A coal train, eastbound, with one engine at the head, and one in the rear, passed through the tunnel while the fans were making 60 r. p. m. The tunnel was found to be entirely clear three minutes after the second engine passed the east portal. Another eastbound train made up in the same manner passed through the tunnel with fans running at 100 r. p. m. The tunnel was clear in 2½ minutes after the rear engine passed the east portal.

On April 18 and 19 further tests were made with the plant in complete working order. On the 18th, with outside temperature at 65 deg., the tunnel, after having



This account would be incomplete without reference to the excellent design and workmanship of the fans supplied by the B. F. Sturtevant Company, of Boston, Mass., and of the boilers supplied by the Oil City Boiler Works, of Oil City, Pa., who were contractors for this part of the plant. The remainder was built by the forces employed by the Norfolk & Western Railway Company, and the whole is a very creditable piece of construction.

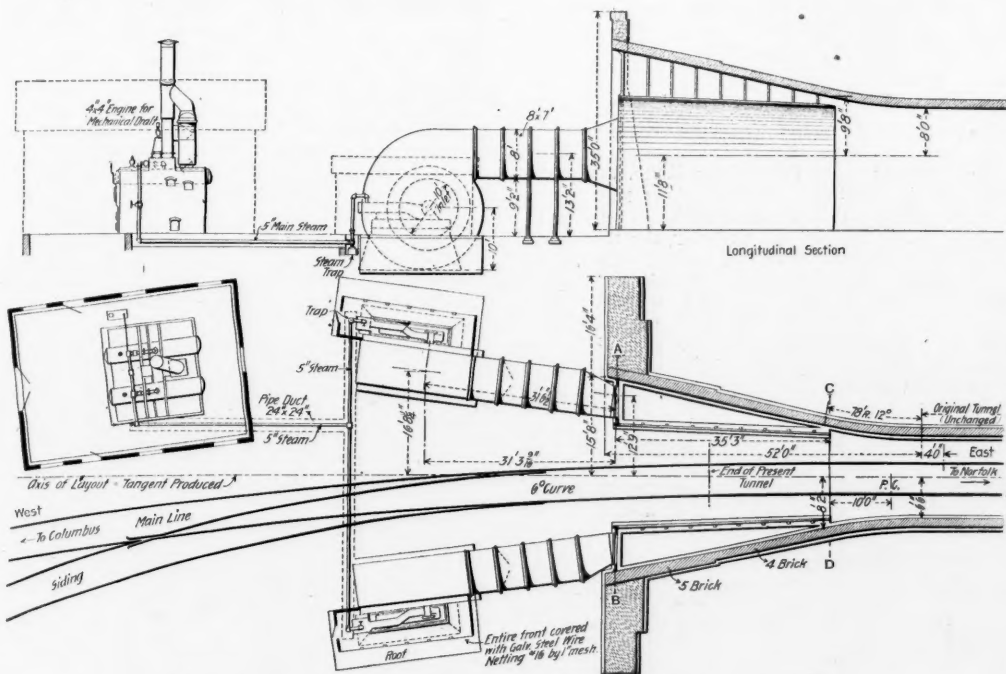
Roanoke, Va., April 22.

On April 2, 1901, a patent was granted to Mr. Churchill and to Mr. C. C. Wentworth, Bridge Engineer of the Norfolk & Western, for the method and apparatus for ventilating, the performance of which is described in Mr. Churchill's communication above. From the patent specifications we give the following summary of the general theory of the apparatus.

An air chamber is formed in the side walls and roof of the tunnel, being in fact the nozzle of an injector. This chamber gradually tapers from the entrance to the blast opening, as seen in the engravings, and into this chamber air is forced by blowers. The area of the blast opening must be proportioned to the size and length of the tunnel.

The essential object is to create a current of air through the tunnel by blowing a blast of air through the tunnel away from the ventilating apparatus and at a rate of speed sufficiently great to clear the foul air from the tunnel in a reasonably short time. The resistance offered to the desired motion of the air in the tunnel in order to thus clear it of foul air is that due to friction. This resistance varies as the square of the velocity of the current, and hence it necessitates the continuous performance of work in order to maintain the current at a uniform speed and at such speed as to effect the purpose desired.

When a blast of air is forced in at a high initial velocity the induced or ventilating current will be discharged from the other end of the tunnel at a comparatively low velocity, and hence the difference between the high initial velocity and the final comparatively low velocity will represent the work done. Now while the initial velocity and volume of a blast of air discharged into the tunnel must be sufficiently great to enable it to make up the necessary units of work above indicated in overcoming the friction, etc., the volume of this blast must be less than this volume of air blowing through the tunnel per unit of time, as otherwise part of the air would be forced back. As the volume of this blast is less, as above stated, the remainder of the air flowing through the tunnel is necessarily supplied by an induced current flowing into the tunnel by its mouth, and the acceleration of this induced current is part of the work which the air-blast must perform. The volume of induced current or draft depends on the coefficient of friction in the tunnel. The less the friction the greater will be the available work developed by the blast and available for the induced draft. In order, therefore, to proportion the parts for ventilating a given tunnel, there may be generally used a ratio, which we may call R and which is constant for a given tunnel. The length of the tunnel may be represented in feet by L, the area of the cross-section of the tunnel



Ventilating Elkhorn Tunnel—General Plan of Injector and Machinery.

Area of cross section of tunnel above base of rail, 234.75 sq. feet.
Perimeter cross section of tunnel above base of rail, 45.37 feet.
Total Perimeter of cross section of tunnel, 58.37 feet.

Length of tunnel east of line C D..... 2972 feet.
Rise going east 42 feet in 2972 feet.

been cleared by the fans, showed a temperature of only 58 deg., and while the thermometer rose 8 deg. for an instant while an engine was passing it, the temperature just as rapidly fell to 58 deg. after engine had passed.

On April 19 the weather was stormy, with wind from the east—the most unfavorable conditions for natural ventilation of this tunnel. Further, the wind was against the direction of forced draft.

With the fans running at 121 r. p. m. and boiler pressure 105 lbs., an anemometer showed the speed of air in the tunnel to be 1,500 ft. a minute; i.e., that fresh air was being driven through the entire length of the tunnel at the rate of 352,500 cu. ft. a minute.

When the fans were running at 139 r. p. m. the speed of air in the tunnel was shown by the anemometer to be 1,681 ft. a minute, corresponding to the delivery of 395,085 cu. ft. of fresh air a minute.

A three-engine eastbound train of coal passed through the tunnel in six minutes, while the fans were running at 142 r. p. m., boiler pressure 102 lbs. The observer on the first engine rode on the tank, and the engineer had the windows of the cab open. He reported the tunnel entirely clear two-thirds of the way through, and no objectionable smoke anywhere. The enginemen reported tunnel O. K. An observer at the east portal reported that the smoke of the train came out two minutes ahead of the first engine. The observer on the second engine rode in the cab with all windows open. He could see the smoke of his engine seven cars ahead of his engine; no smoke behind the tank; tunnel clear at the engine, and cool. The observer on the rear engine rode in the cab with windows open; he found the tunnel practically clear and no smoke behind, showing that fresh air was with his engine throughout. A small amount of steam adhered to the roof of the brick work near the east portal, but this passed out in about one minute after the engine passed out. The reports of enginemen agreed with these as to clear and cool tunnel.

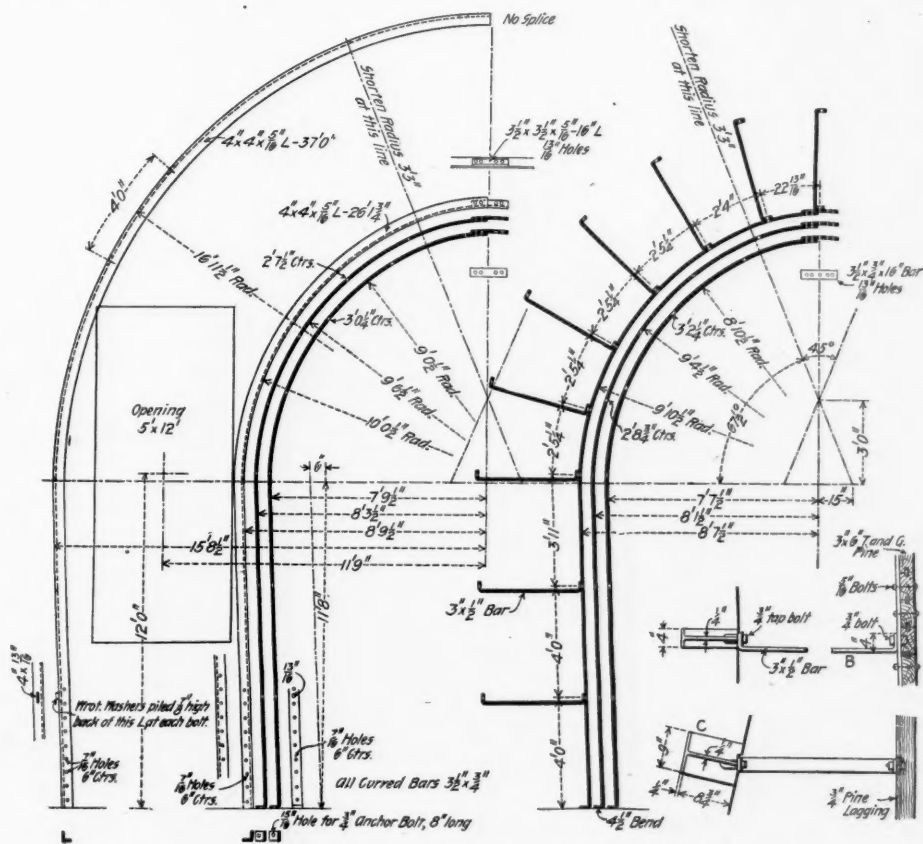
A two-engine train, east-bound, passed through the tunnel in about 5½ minutes, while the fans were making 140 r.p.m.; boiler pressure 107 lbs. Cab windows of engines were all open; enginemen reported tunnel clear and cool.

Many other tests showed the same results, and proved conclusively the following facts:

- (1) This tunnel can be ventilated under the ordinary acceptance of the term and in a much more positive manner than by other methods in use with the fans running not in excess of 80 revolutions a minute; the tunnel being thus cleared on the passage of a train and put in condition for immediate use of a following train.
- (2) The air of the tunnel is kept fresh and cool at all times by one fan running not over 80 revolutions or two fans at 30 revolutions.
- (3) The final result desired by the officers of this com-

pany, namely, keeping gases entirely away from and ahead of freight engines, is accomplished also when fans are run from 130 to 140 r. p. m.

Finally, all these results are secured without any reduction of the area of tunnel, which, in this country, is regarded always as very undesirable; they are accomplished in a positive and perfectly controllable manner, as compared with the variable results from the use of fans and shafts; and, finally, any desired amount of fresh air can be delivered at such speed as may be necessary to suit the traffic.



Ventilating Elkhorn Tunnel—Details of Iron Work.

in square feet by A, and we can find the ratio R by the formula:

$$(a) R = \sqrt{\frac{.042 L}{V A}} + 1.$$

If we then assume the velocity at which it is desired to have the air current move through the tunnel as V feet per minute and call the required velocity of the blast at the outlet of the air passage-way S feet per minute, we can put

$$(b) S = R V$$

and the required area C in square feet of the outlet is

$$(c) C = \frac{1.2 R}{A}$$

The volume of the blast in cubic feet per minute is then SC. This will enable the blast requirements to be met by makers of blowing machinery. For example, for a tunnel 4,000 ft. long, with an area of cross-section 256 sq. ft., R is 3.39 and the required area of the blast outlet is 63 sq. ft. If the velocity of air through the tunnel is desired to be 1,000 ft. per minute, the velocity of the blast should be 3,390 ft. per minute and the volume of air to be delivered by the blowers is 213,570 cu. ft. per minute.

The main point to be considered is to properly proportion the area of the blast outlet to the area and length of the tunnel. This being done, it is of no importance how much air is delivered per minute by the blowing machinery as far as the creation of a current in the tunnel is concerned or at what corresponding speed it passes through the outlet C. The question is "in how short a time must the tunnel be cleared." This will fix the desired velocity V, which velocity can be attained

engineering colleges preferred, but young men of ordinary intelligence and public school training are eligible, and put them at track work and keep them at it from one to two years, teaching them the fundamental principles of track work, railroad maintenance and operation, with a view to fitting them for higher positions. There are about 140 apprentices in the employ of the company, and Mr. Wallace has expressed himself as well pleased with the results so far obtained.

"He says: 'Of course, we do not expect that every young man who enters the service as a track apprentice will be able to rise to a position of trust, but with the practical knowledge gained at track work a greater per cent. of competent men will be obtained from the track apprentices than from engineers who have never received such training.'

"The association is formed of such of these apprentices as have been in the employ of the company for one year."

The Harbor of Chicago—Scherzer Bridges.

In removing obstructions to navigation and to the flow of water through the Chicago River, the trustees of the Sanitary District of Chicago are pushing their work as rapidly as the many obstacles to be overcome will permit. The first and probably the most important part of the work consists in the ultimate removal of the center pier swing bridges. The swing bridge at Taylor street has been removed and replaced by a Scherzer rolling lift bridge, recently completed. The specially obstructive railroad bridge near the Taylor street bridge will be removed within a few months, as the new double-track Scherzer rolling lift bridge of 275 ft. movable span will soon be completed and placed in

traffic across the bridges. After all the swing bridges have been removed and replaced by the more modern type of bascule bridge and the obstructive tunnels have been lowered or removed, the largest lake vessels can readily reach any point along the 56 miles of dock frontage comprising the present internal harbor of Chicago, and the delays heretofore caused by the slow passage of the vessels through the narrow openings provided by the old swing bridges will be obviated. The highway traffic will also be greatly facilitated, as the present comparatively small and frequent vessels will be replaced by larger vessels, less frequent but carrying a larger tonnage.

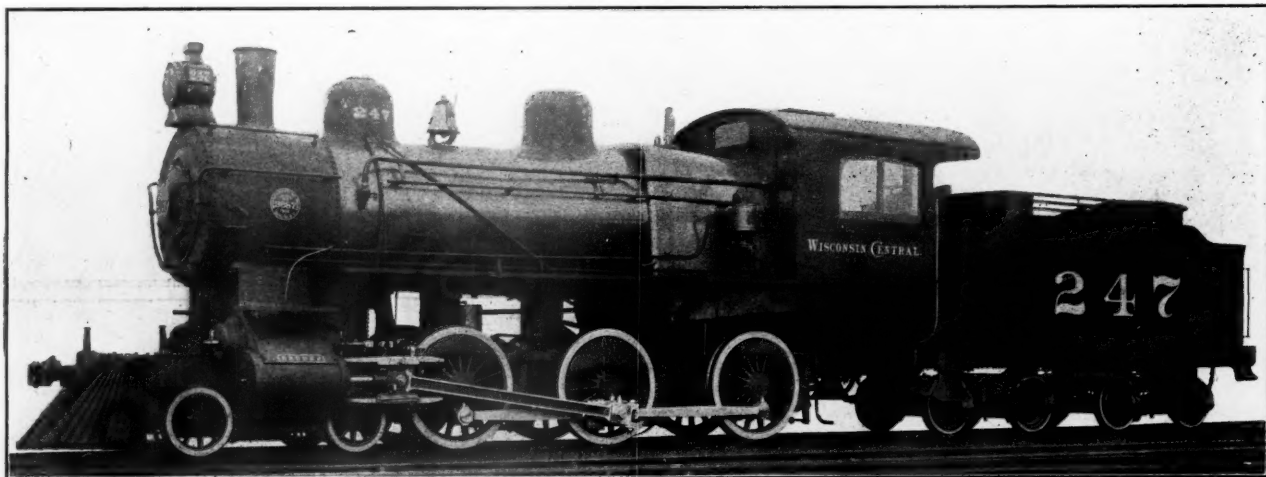
Chicago, May 3.

A. H. S.

Ten-Wheel Wide Fire-Box Locomotive for the Wisconsin Central Railway.

The Brooks Locomotive Works have built 10 10-wheel freight locomotives for the Wisconsin Central which are particularly interesting because they have wide fire-boxes and will burn bituminous coal. As in other wide fire-box engines lately built the cab is in the rear. The principal features are shown by the engravings.

The fire-box is 74 in. wide and 108 in. long with a grate area of 54.4 sq. ft. The total heating surface is 2,430 sq. ft., so that there are about 44 sq. ft. of heating surface for each foot of grate. This figure may be compared with 65 for the Northwestern type engines of the Chicago & Northwestern; 56 for the Chautauqua type engines of the Burlington, Cedar Rapids & Northern; 48 for the Atlantic type engines of the Pennsylvania R. R.; 63 for the Atlantic type engines of the Baltimore & Ohio; 49 for the Prairie type engines of the Chicago, Burlington



Ten-Wheel Freight Locomotive—Wisconsin Central Railway.

by forcing a corresponding amount of air through the blast passage.

It will be seen that the air-blast can be discharged into the tunnel in a direct course without obstruction, that the maximum velocity of induced current for ventilation can be secured with the minimum expenditure of work for a given velocity of ventilating current, and that no obstructions to the passage of trains exist, because the clearance of the tunnel is not reduced. It is also apparent that the invention can be readily applied to existing tunnels, as well as to new tunnels, and, further, that it may be utilized on mining shafts or tunnels or other like underground works.

The general layout of the Elkhorn installation is shown clearly. The sectional plan shows the boiler house, the blowing fans on either side and the injector or air chamber. It will be seen that the air is blown in by two 14-ft. fans and delivered through pipes 8 ft. x 7 ft. into the injector. The engines are 12 in. x 24 in. with 75 h.p. water-tube boilers and mechanical draft. The fans (14 ft. x 7 ft.) are driven by 75 h.p. direct-connected engines and will deliver, each, 168,558 cu. ft. per minute at 1 ounce pressure and 117.4 revolutions.

Illinois Central Track Apprentices.

From a Memphis journal we get the following account of an interesting organization which has been established on the Illinois Central Railroad. This seems to be another one of those important steps which intelligent administrative officers are now taking towards training up an efficient staff of young officers and employees.

"About twenty-five members of the Association of Track Apprentices of the Illinois Central Railroad met here the 27th. The meeting was called to order and an address delivered by J. H. Scott, President. W. B. Morgan, of Grenada, Miss., read a paper entitled 'The Opportunities of a Track Apprentice.' A. E. Bliss, of Robinsonville, Miss., also read a paper, 'What an Engineer Should Do.'

"The idea of track apprentices originated with J. F. Wallace, Assistant General Manager of the Illinois Central. The plan is to take young men, graduates from en-

service. Contracts have been awarded and work has commenced upon the new Scherzer rolling lift bridges replacing the swing bridges at Canal and Main streets. Bids are advertised to be submitted May 8, 1901, for a Scherzer bridge to replace the swing bridge at Randolph street.

The Scherzer Company have also recently completed plans for a new bridge at State street to replace the present swing bridge, which is extremely obstructive to navigation on account of a bend in the channel of the river at the site of this bridge. The new bridge will give a clear channel for navigation 140 ft. wide; the movable span, center to center of bearings, will be 161 ft. 8 in.; the roadways, center to center of trusses, will be 40 ft. 6 in. wide, with two sidewalks each 11 ft. wide.

As State street is the principal retail business street of the city of Chicago, and the bridge is near the business center, it was decided to make the outlines of the new bridge as artistic as possible without increasing the present cost of the structure. The bottom chord is arched and the top chord projects but slightly above the roadway, thus giving a deck bridge with an unobstructed view. The new bridge when completed will not only facilitate navigation, but will present a striking contrast to the present unsightly swing bridge. The bridge without extra cost for ornamentation will be in harmony with the growing demand for more artistic bridge structures at Chicago.

Plans have also been completed for Scherzer rolling lift bridges to replace the swing bridges at Harrison street and Eighteenth street, and within a few weeks the Scherzer Company will have completed plans for a new bridge to replace the swing bridge at Polk street. All of the above new bridges will give an unobstructed channel of 140 ft. in width, or wide enough to pass side by side two of the largest vessels likely to enter the harbor of Chicago for many years to come. The wide channels provided will enable vessels to pass the bridges rapidly, and time will also be saved as all bridges are designed to be operated by electricity and may be opened or closed within 30 seconds.

As soon as these bridges are in service the work of removing the other obstructive swing bridges can be proceeded with, without unduly obstructing the street

& Quincy, and 69 for the new Atlantic type engines of the New York Central & Hudson River. It will be seen that the Wisconsin Central engines have proportionally larger grates than any of these.

These engines were put in service during November and December and have been giving very satisfactory service. The weight on drivers is 122,000 lbs., the total weight is 158,000 lbs., the cylinders are 20 x 26 in., the driving wheels are 57 in. in diam. and the working steam pressure is 200 lbs. The theoretical tractive effort, taking the mean effective pressure as 85 per cent. of the boiler pressure, is about 31,000 lbs. or approximately one-fourth the weight on drivers.

The boiler is of the improved Belpaire wagon top type with direct stays. The fire-box heating surface is 186.6 sq. ft., the tube heating surface 2,243 sq. ft., making a total of 2,429.6 sq. ft. of heating surface. The fire-box is 68 3/4 in. deep at the front and 52 1/2 in. at the back. The tubes are 2 in. in diam. and but 13 ft. 10 1/4 in. long. Piston valves are used with inside admission.

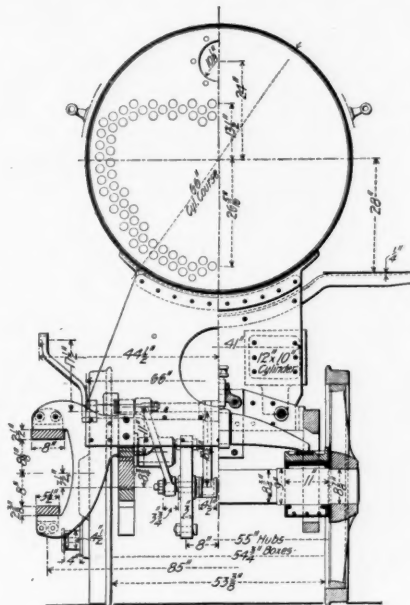
The tender loaded weighs 102,000 lbs., and has a capacity for 5,000 gals. of water and 9 1/2 tons of coal. The underframe is made of 10-in. steel channels. The special equipment includes: American driver brakes, Westinghouse tender brakes, Nathan lubricators, Consolidated safety valves, Ohio injectors, A. French springs and Jerome metallic packing for piston rods. Other dimensions are as follows:

Wheel base, total of engine.....	24 ft. 10 in.
Wheel base, driving.....	14 ft. 6 in.
Wheel base, total engine and tender.....	52 ft. 11 1/2 in.
Length over all, engine.....	38 ft. 9 in.
Length over all, total engine and tender.....	62 ft. 3 1/2 in.
Height, center of boiler above rails.....	9 ft. 1 in.
Height of stack above rails.....	14 ft. 11 1/2 in.
Drivers, material of centers.....	Cast steel
Truck wheels, diameter.....	30 in.
Journals, driving axle.....	9 x 11 in.
Journals, driving axle, wheel fit.....	5 1/2 x 12 in.
Journals, truck axle.....	5 1/2 x 12 in.
Journals, truck axle, wheel fit.....	5 1/2 x 12 in.
Main crank pin, size.....	6 1/2 x 6 in.
Main coupling pin, size.....	7 x 4 1/2 in.
Main pin, diameter, wheel fit.....	7 1/2 in.
Piston rod, diameter.....	4 in.
Main rod, length center to center.....	119 in.
Steam ports, length.....	22 in.
Steam ports, width.....	2 1/2 in.
Exhaust ports, least area.....	75 sq. in.
Bridge, width.....	28 in.
Valves, kind of.....	Improved piston

Valves, greatest travel.....	5 1/2 in.
Valves, steam lap (inside).....	3/4 in.
Valves, exhaust clearance (outside).....	9 in.
Lead in full gear.....	3-32 in. positive
Lead, constant or variable.....	Variable
Boiler, material in barrel.....	Steel
Boiler, thickness of material in shell.....	5/8 in., 11-16 in., 9-16 in., and 1/4 in.
Boiler, thickness of tube sheet.....	3/4 in.
Boiler, diam. of barrel, front.....	66 in.
Boiler, diam. of barrel at throat.....	71 3/4 in.
Boiler, height at back head.....	76 3/8 in.
Seams, kind of horizontal.....	Quintuple lap
Seams, kind of circumferential.....	Double and triple lap
Crown sheet stayed with.....	Direct stays
Dome, diameter inside.....	30 in.
Fire-box, material.....	Steel
Fire-box, thickness of sheets.....	3/8 in.
Fire-box, crown, 5/8 in.; tube, 5/8 in.; sides and back, 3/4 in.	
Fire-box, brick arch.....	On water tubes
Fire-box, mud ring, width. Back and sides, 3 1/2 in.; front, 4 in.	
Fire-box, water space at top.....	Back, 7 in.; front, 4 in.
Grates, kind of.....	Cast iron, rocking
Tubes, number of.....	312
Tubes, material.....	Charcoal iron
Tubes, outside diameter.....	2 in.
Tubes, thickness.....	No. 11 B. W. G.
Tubes, length over tube sheets.....	13 ft. 10 1/4 in.
Smoke-box, diameter outside.....	69 in.
Smoke-box, length from tube sheet.....	63 in.
Exhaust nozzle.....	Single
Exhaust nozzle, diameter.....	Permanent
Exhaust nozzle, distance of tip above center of boiler.....	5 1/4 in.
Netting, size of mesh.....	2 1/2 in. x 2 1/4 in.
Stack, taper.....	15 1/4 in.
Stack, least diameter.....	15 1/4 in.
Stack, greatest diameter.....	18 1/4 in.
Stack, height above smoke-box.....	3 ft.

Tender.

Type.....	8-wheel
Tank, type.....	U-shape
Tank, capacity for water.....	5,000 gallons
Tank, capacity for coal.....	9 1/2 tons
Tank, material.....	Steel
Tank, thickness of sheets.....	3/4 in.
Type of under frame.....	Brooks, 10-in. steel channel
Type of trucks.....	Brooks, 100,000 lbs.
Type of springs.....	Triple elliptic

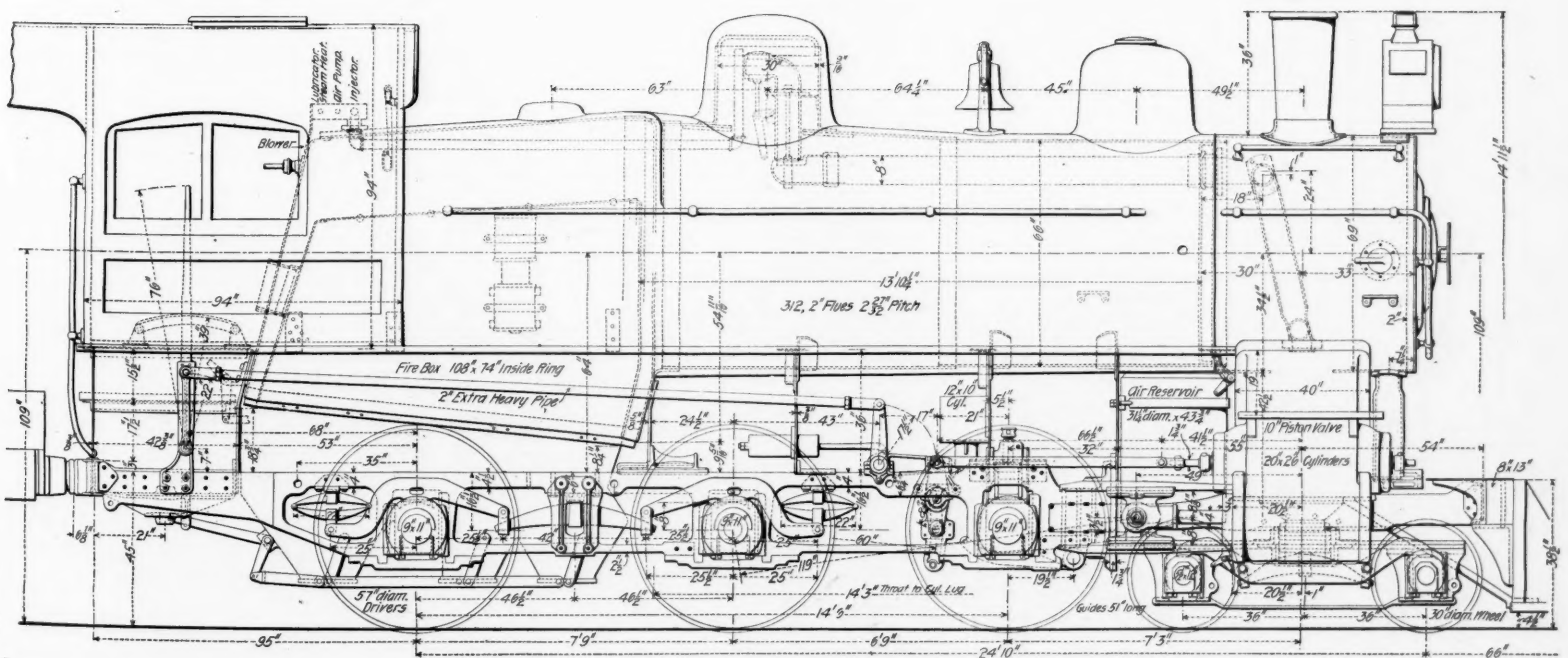
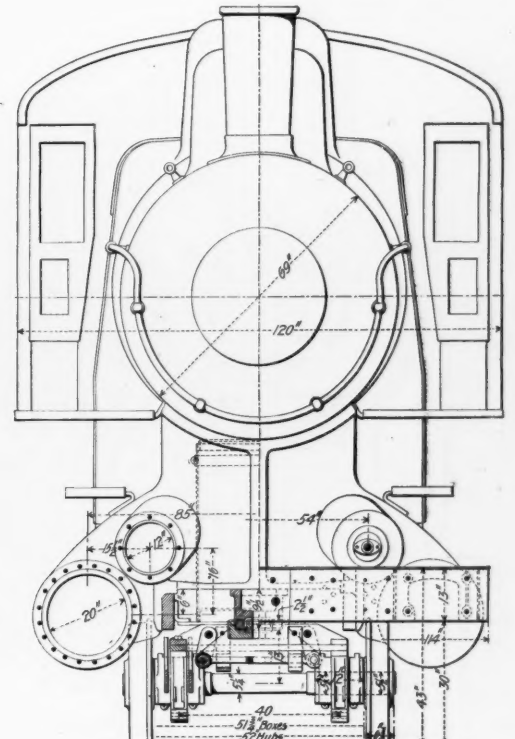
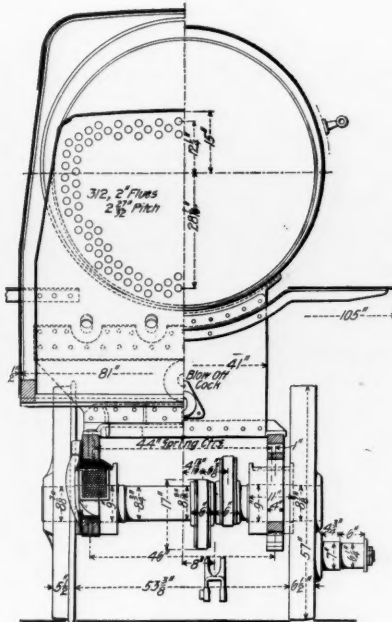
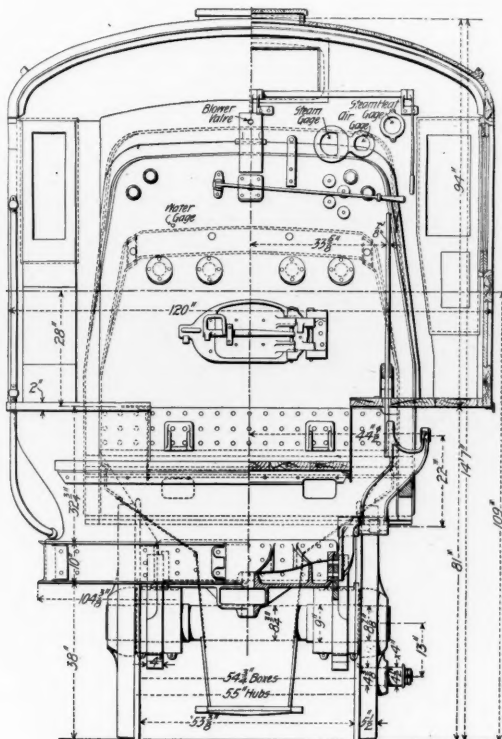


Diameter of wheels.....	33 in.
Diameter and length of journals.....	5 in. x 9 in.
Distance between centers of journals.....	5 ft. 5 in.
Diameter of wheel fit on axle.....	6 1/2 in.
Diameter of center of axle.....	5 1/2 in.
Length of tender over bumper beams.....	21 ft. 7 in.
Length of tank inside.....	19 ft. 6 in.
Width of tank inside.....	9 ft. 10 in.
Height of tank, not including collar.....	52 in.
Type of draw gear.....	Munton M. C. B.

The Influence of the Brakes on the Life of a Rail.

At a meeting of the Sheffield Society of Engineers and Metallurgists, Prof. J. O. Arnold delivered an address entitled, "A Criticism of the Report of the Board of Trade Committee on Steel Rails." Our readers must remember the circumstances of this report, now famous, and something of its findings, for we have printed a good deal of it or about it. However, what we quote from Mr. Arnold does not demand a knowledge of the report.

As to the absence of deterioration after long service, Mr. Arnold said: "It will be seen that in a rail tested after some 18 years' service under low speeds and no braking, neither the tensile nor the drop test indicated any evidence of fatigue in samples taken from the end and the middle of the rail. Another rail, subjected to high speeds, but no braking, also throughout showed no signs of deterioration. But a third rail, over which high speeds and severe braking had been the rule, showed at the end near the fish bolt holes remarkable deterioration both in the head and foot. It will be noted that under the drop test the steel was hopelessly brittle, and in the tensile test from the head the elongation was only 1 per cent. in 2 in., whilst that from the foot of the rail gave no more than 3.7 per cent. On the other hand, the series made on steel taken from the middle of the rail exhibited only



Wisconsin Central Ten-Wheel Freight Locomotive.

very slight mechanical signs of deterioration. The tensile tests from both head and foot gave an elongation of about 18 per cent., and this portion of the rail also stood an excellent drop test. There seems little doubt that a steel rail may, under certain conditions, run out a life of 20 years and be dismissed with an excellent character; whilst had the same rail been subjected to severe braking it might have badly deteriorated.

"The question for rail steel metallurgists is: Is there any chemical composition which, combined with practical reheating and rolling conditions, will give a rail incapable of deteriorating in any circumstances in which it may be placed during a period of 20 years? Personally, I am not so sanguine as to venture off-hand to answer this question in the affirmative?"

Automatic Block Signals on the Central of New Jersey.

Between 1890 and 1893 the Central Railroad of New Jersey installed automatic block signals of the Westinghouse Electro-Pneumatic type, on its four main tracks between Jersey City and Bound Brook, N. J. The signals, 481 in all, are of the semaphore type and are operated under the normal clear method. This installation, on the busiest section of the line, gave such satisfactory results that early in 1900 it was decided to extend the automatic signaling from Bound Brook, N. J., to White Haven, Pa., over some 112 miles of double track.

After a careful investigation of the merits of the various automatic electric signals in the market, a competitive test was conducted under the supervision of Mr. C. P. Adams, Superintendent of Telegraph for the road, in which the apparatus of the respective makers was required to operate each home and distant signal once every minute (2,880 times every 24 hours), until their batteries were exhausted. In addition to this, tests were made as to the strength of the operating mechanism, motor efficiency and the counterweighting of the signals. As a result of these tests, believed to be the most exhaustive ever made in connection with a railroad signal, the contract was awarded to the Union Switch & Signal Company, of Swissvale, Pa., on the strength of the merits of its automatic electric semaphore, and of its normal clear method of control, using polarized relays and track circuits.

The post of this signal is of iron, mounted on a concrete foundation, with double light semaphore castings and wooden arms. The operating mechanism is housed in an iron box at the foot of the post. The post is of 5-in. iron pipe, and the connections to the signal arm are carried inside the post to protect them from weather influences.

The "wireless" circuit, heretofore described in the *Railroad Gazette*, is used. In this the control of the distant signal is accomplished by requiring the track battery to perform a double function. It not only controls the home signal, as in all rail-circuit signals, but, by reversing the direction in which the current is sent through the rails, it also controls the distant signal. Thus, the battery and the wire lines usually required for the control of the distant signal are dispensed with. This method of operating signals, since its introduction by the Union Company, has met with great favor and is in extensive use on the Pennsylvania, the Michigan Central, the Delaware, Lackawanna & Western, and, to a lesser extent, on other roads.

It has been found, in automatic signaling, that much of the trouble from lightning is traceable to the presence of line wires in the circuits. Furthermore, the application of line wires for signal purposes often has involved the reconstruction of telegraph lines. The Union people believe that the wireless system offers almost complete immunity from lightning troubles.

The block sections are about one mile long, except at points where traffic is very heavy, where the sections are somewhat shorter. With home and distant signals on each post, full speed is practicable under all circumstances. The block signaling will be carried through the yards where interlocking is in use, where the signals will be controlled both from the tracks and from the cabin. The present train order signals, where retained, will control the distant signals of the blocks in which they are located.

It will be observed that the spectacles in the semaphore are designed for three glasses. The signal is not, however, a three-position signal; the two upper glasses are both red.

The Clergue Enterprises at the Soo.

A couple of months ago Mr. Francis H. Clergue made a long address at a dinner given to him by the citizens of Sault Ste. Marie, Ont., in which he set forth some facts about his various enterprises at that place. He told them that his companies had already expended

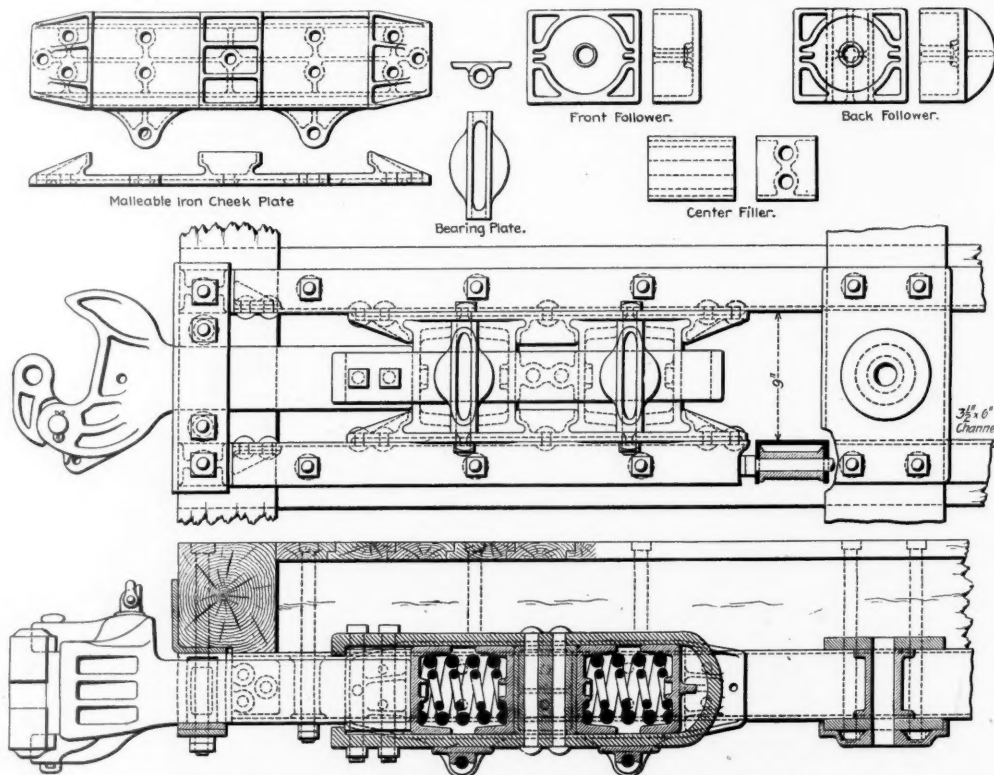
in works at Sault Ste. Marie (Ontario) or tributary thereto over \$9,000,000 and that over \$9,000,000 more is to be spent before these works are completed. These sums do not include the outlays at the Sault Ste. Marie in Michigan. He mentions among the works at the Canadian Soo the Algoma Iron Works, where the machine shop, foundry and blacksmith shop now employ 300 men. The capacity of these works will be doubled at once. The Sault Ste. Marie Pulp & Paper Company has now 1,000 men on the payroll, which number is to be increased to 1,500 this spring by the opening of a new pulp mill. The Tagona Water & Light Company has spent \$300,000 on the construction of works and will spend \$50,000 more this spring in an increase. The Lake Superior Power Company has spent over \$3,000,000 and employs 1,000 men. The additional works to be begun this spring will cost \$5,000,000 more. These include an electric street railroad, a new power canal, blast furnaces and steel plant. The Algoma Central Railway has spent over \$3,000,000 in construction, which construction will be further continued this year. The total expenditure is estimated at \$5,000,000. The Algoma Commercial Company has projected work for the year which will employ 1,000 men. The steamers and steamship lines owned and operated by this company now employ 250 hands and these will be at once doubled in number. Reduction and refining works now under construction will be finished this season and will employ 500 hands.

Mr. Clergue says "you are familiar with the use of sulphur from nickel ores for paper making and are aware that desulphurized nickel ore is one of the most valuable materials, namely, nickel steel. We have devoted years to the practical development of our methods of producing nickel steel. You can now witness under construction at Sault Ste. Marie a steel works intended to produce 600 tons a day, and which, in my judgment, will continue under construction until its capacity reaches 3,000 tons a day."

Mr. Clergue speaks especially of the fuel situation in answer to the point always raised that they cannot make steel at the Soo because fuel costs too much. With regard to this he points out first that the ore ships returning to Lake Superior will carry coal and coke back to the Soo and deliver it at a less cost for fuel than in any other country than the United States. He points out further that the use of water power in the steel plant will more than balance the additional cost of fuel; but beyond all that is the fact that they have an enormous forest region behind them with over a million acres of hard wood and that they can make charcoal pig iron as cheap as coke iron is made in any part of the world. But 25 acres of land must be cleared every day to supply the charcoal furnaces. Thus 300 farms of 25 acres will be cleared every year, and so they will open up new country for farmers.

A Tandem Spring Draft Gear.

The accompanying engraving shows the tandem spring draft attachments made by the Wilmington Malleable Iron Co., Wilmington, Del. The attachments are shown



Tandem Draft Attachment Made by the Wilmington Malleable Iron Co.

as applied to steel channels, but similar attachments are used with single springs and they are also used with both wood and metal draft sills. But one design is here illustrated. Where the attachments are fastened to wood, bolts are used instead of rivets and the cheek plates are gained into the timbers.

In the particular case shown, 6-in. channels are used for draft sills which extend through the plate body bol-

sters and are bolted to the center sills. These sills are spaced 9 in. apart. The cheek plates are malleable iron castings which are riveted to the draft sills, and it will be seen that the projections for the follower stops are lips. These lips engage corresponding projections on the followers and are designed to correct the tendency to spread the draft sills where plain plate followers are used. The flanges on the followers are made to meet before the springs close solid. It will also be seen that the rear end of the yoke is rounded, which is doubtless an improvement over the ordinary yoke with sharp corners. The center filling piece of the yoke is a malleable casting and is held by two rivets.

Pensions on the Illinois Central.

The Directors of the Illinois Central have decided to establish on July 1, a pension department, and following is the substance of the regulations under which it will be conducted:

1. Administration shall be by a Board of Officers, to be known as the Board of Pensions. Such Board shall, until otherwise ordered, consist of: C. A. Beck; W. J. Harahan; C. F. Krebs; William Renshaw; A. W. Sullivan; J. F. Wallace; Dr. J. E. Owens.

2. The office of the Board is at Chicago. Its acts are subject to the approval of the president, and when so approved shall be final and conclusive. * * *

5. The benefits of the pension system will apply only to those persons who have been required to give their entire time to the service of the company, and will not apply to the Law and Surgical Departments.

6. All officers and employees who have attained the age of seventy years shall be retired. Such of them as have been ten years in the service shall be pensioned.

7. Locomotive engineers and firemen, conductors, flagmen and brakemen, train baggagemen, yard masters, switchmen, bridge foremen, section foremen and supervisors, who have attained the age of sixty-five years may be retired. Such of them as have been ten years in the service shall be pensioned when retired.

8. Officers and employees between sixty-one and seventy years of age, who have been ten years in the service and who have become incapacitated, may be retired and pensioned.

9. In case an employee between sixty-one and seventy years of age claims that he is, or should his employing officer consider him incapacitated for further service, he may make application or be recommended for retirement, and the Board of Pensions shall determine whether or not he shall be retired from the service. Physical examination shall be made of employees recommended for retirement who are under seventy years of age, and a report thereof with the recommendation of the Chief Surgeon shall be transmitted to the Board of Pensions for consideration in determining such cases. * * *

11. The terms "service" and "in the service" will refer to employment upon or in connection with any of the railroads operated by the company, and the service of upon such railroads, whether prior or subsequent to their control or acquisition by the Illinois Central.

12. In computing service, it shall be reckoned from the date since which the person has been continuously in the service, to the date when retired. Leave of absence, suspension, dismissal followed by reinstatement any employee shall be considered as continuous from the date from which he has been continuously employed within one year, or temporary lay-off on account of reduction of force, when unattended by other employment,

is not considered as a break in the continuity of service. Persons who leave the service thereby relinquish all claims to the benefits of pension allowances.

13. The pension allowances authorized are upon the following basis:

For each year of service an allowance of one per cent. of the average regular monthly pay received for the ten years preceding retirement. Thus, by way of illustration: If an employee has been in the service for forty years and has received on an average for the last ten years \$50 per month regular wages, his pension allowance would be forty per cent. of \$50 or \$20 per month.

14. The sum of \$250,000 is set apart as a Pension Fund; in addition to which the company will in each year make a further appropriation of an amount not to exceed \$100,000 in payment of pension allowances for such year.

Whenever it shall be found that the basis of pension allowances shall create demands in excess of the \$250,000 and an annual appropriation of \$100,000, and as often as such condition may arise, a new basis ratably reducing the pension allowances may be established to bring the expenditures within the limit of the fund, and the decision of the Board of Directors in establishing such new basis shall be absolutely conclusive. Notice of such new basis shall be given before the beginning of the year in which it may be decided to put the same into effect.

15. When pension allowances shall be authorized, pursuant to these regulations, they shall be paid monthly, during the life of the beneficiary; provided, however, that the company may withhold its allowance in case of gross misconduct on his part. * * *

17. It shall be the duty of every employing officer to report at once all employees who in July, August or September, 1901, shall have attained the age of seventy years * * * and thereafter, at least three months in advance of the date of retirement, all employees about to attain the requisite age for consideration for a pension allowance.

18. Each officer charged with the duty of preparing the pension rolls must keep himself advised of the whereabouts of employees who have been retired from the service. * * * When they do not reside within the jurisdiction of the officer of the Department in which they were engaged before being retired from the service, such officer shall require satisfactory evidence from such employee, at least once a year, and oftener as may be required, showing that he is entitled to a pension allowance.

19. To the end of preserving direct personal relations between the company and its retired employees, and that they may continue to enjoy the benefit of the pension system, no assignment of pensions will be permitted or recognized.

20. The acceptance of a pension allowance does not debar a retired employee from engaging in other business, but such person cannot re-enter the service of the company.

21. No person inexperienced in railway work over thirty-five years of age, and no experienced person over forty-five years of age, shall hereafter be taken into the service; provided, however, that in the discretion of the President persons may temporarily be taken into the service irrespective of age for a period not exceeding six months, and that this period may be extended, if necessary, to complete the work for which such persons were originally employed; provided, also, that, with the approval of the Board of Directors, persons may be employed indefinitely, irrespective of the age limit, where the service to be rendered requires professional or other special qualifications.

22. The action of the Board of Directors * * * shall not be construed as giving to any officer or employee a right to be retained in its service, or any right to any pension allowance. * * *

The Air-Brake Association.

A meeting of the Air-Brake Association was held at the Leland Hotel, Chicago, from April 30 to May 3 inclusive. Five papers were discussed as well as a few miscellaneous topics. Mr. G. W. Rhodes at the first session gave a talk on the early history of the air-brake, and the Association was also addressed by Mr. John T. Chamberlain, President of the Master Car Builders' Association.

The next meeting will be held the last Tuesday in April, 1902, at Pittsburgh, Pa. The officers elected for the ensuing year are: President, Otto Best, Nashville, Chattanooga & St. Louis; First Vice-President, J. E. Goodman, Northern Pacific; Second Vice-President, W. P. Huntley, Chesapeake & Ohio; Third Vice-President, F. F. Coggin, Maine Central; Treasurer, E. G. Desoe, Boston & Albany, and Secretary, F. M. Nellis, Locomotive Engineering. W. C. Hayes, Baltimore & Ohio, and W. Haverstick, Wisconsin Central, were elected to fill vacancies in the Executive Committee. The following are extracts from the papers:

The Pressure Retaining Valve.—(Committee: G. R. Parker, J. H. Stricklan, E. Kronberg, W. L. Clendenen and C. R. Ord.)

The modern pressure retaining valve undoubtedly combines in a device that performs a most important duty, the utmost simplicity, it consisting of merely a weighted valve and a cock for throwing it into and out of operation. Once put up properly it requires ordinarily no more care than, at the most, a cleaning once in a year or two. The following

well-known facts make necessary the use of the pressure retaining valve, when trains are descending steep grades:

First. Either because of too much holding power, resulting from an undesirably heavy application, train pipe leakage, lighter grade or sharp curves, or by reason of reduced auxiliary reservoir pressure, due to supplying the leakage from brake cylinders, the triple valves must occasionally be moved to release position; in the first instance to reduce the holding power and in the second to recharge the auxiliary reservoirs.

Second. The release position of the triple valve will, so far as it is concerned, result in a quick and full discharge of all brake cylinder pressure, yet, at the same time, permit of but a comparatively slow recharge of the auxiliary reservoir.

Third. In the absence of any holding power the speed increases rapidly.

Fourth. As on steep grade, it is not necessary, under the conditions mentioned, to have all brake cylinder pressure released, any unnecessary reduction results in more being required from the auxiliary reservoir on reapplication. This makes it more difficult to keep recharged and increases the pump labor.

As is well known, the pressure retaining valve is connected to the exhaust port of the triple valve, and, in its cut-in or retaining position, will, when the triple valve is moved to the release and recharging position, permit of a slow discharge of any brake cylinder pressure over 15 lbs., but will retain this amount. This refers to the modern valve. It was preceded by the valve that permitted of a much more rapid discharge of any pressure over its limit, the latter being but 10 lbs. While the most valuable improvements made in the valve consist of increasing by 50 per cent. the pressure retained, and restricting the discharge of any amount in excess of this, yet the stronger construction, lessened amount of brass employed, the separate handle and key, with the strengthened construction of the latter by reason of the milled port, are also of great importance.

That there are yet in use a large number of the older type of valve, which, in addition to their inherent disadvantages, have, through years of use, abuse and neglect, been greatly reduced from their original efficiency, is serious enough; but a more grave situation arises from the fact that, as a rule, the valve, whether old or modern, is not able to perform its duty because of defects other than in the device itself. Neglecting the size and condition of the air pump that may be employed, the volume of the main reservoir and the amount of train pipe leakage, there are found on the car defects which prevent a perfect retaining valve from being of value. If the feed groove is considerably choked with dirt, a too frequent condition, it will be impossible to properly recharge the auxiliary reservoir in the time available. Yet elsewhere than when descending the steep grade this defect is comparatively unimportant.

The following record of one valve tested will demonstrate this, the test being made as per the M. C. B. code rule for determining the time required to charge the auxiliary reservoir from 0 to 70 lbs., with a constantly maintained train pipe pressure of 90 lbs.: In one minute charged to 25 lbs.; two minutes, 48 lbs.; three minutes, 65 lbs.; and three minutes and twenty seconds, 70 lbs. On repeating the test after cleaning the feed groove the reservoir was charged to 70 lbs. in 60 seconds, thus conforming with the M. C. B. requirements. As the valve had been cleaned and lubricated four months before, it is evident that the work was not well done. Recharging is the critical part of air-brake work on descending grades. The quicker it can be accomplished the less the speed need increase and the greater the pressure that can be retained in the brake cylinders. With the triple valve in question less than one-third as much time was required for charging with the clean as against the dirty feed groove. As the effect of such a defect is not apparent down the grade, except that there is a loss of pressure with each recharge, the engine and train men ascribe it to the retaining valves.

If the brake cylinder or retaining valve pipe leaks, the first being quite common and the second the rule, not only will that retaining valve be of lessened or no value, but the tax on other brakes will be increased by each that fails to perform its share of the work. If the piston travel is too long the detrimental effects will be less serious if a good order retaining valve is operating than when the valve is cut out, handle down, yet the brake efficiency is decreased, both by the large space to be filled and the added resistance of the cylinder release spring. Finally, if the retaining valve is not in a vertical position its weighted valve cannot perform its duty.

Quite recently a member of this Association advised that in an examination of about 3,000 cars he found that over 26 per cent. had defects which destroyed the retaining feature. The seriousness of the actual condition and the proof of almost total neglect on the part of the majority of roads, for the inspection was made at an interchange point, is demonstrated by the fact that all the defects noted were found without making a brake test, being such as could be located by the eye and hand without the aid of air pressure. The defects noted were distributed as follows: 152 valves applied at an angle of about 45° from the vertical; 165 with broken pipes, in some cases part of the pipe being gone; 119 loose on end of car; 82 cylinder and reservoir loose on car; 27 retaining valves missing, in 12 instances none ever having been applied; and 265 with retaining valve pipe union loose. In addition to these there were 56 with such an unusual and unnecessary number of pipe joints as to greatly increase the liability of leakage. Another member reports having tested 250 new cars, built by a reputable car building firm, and that it was found impossible to make a joint at the retaining valve pipe union because the nuts were too large, allowing the threads to slip.

As will be seen, the retaining valve pipe causes the most trouble. Nor is this surprising, considering the manner in which it is usually applied. It is the exception to find cars on which this pipe cannot readily be vibrated by one's hand. Tightening loose joints on such is practically a waste of time, unless it is done immediately before a grade is descended, as the shaking of the car will soon loosen them again. The broken handles and cracked keys, either one of which destroys the value of the valve, arise from trainmen using clubs to operate the valve handles.

The question of improving the condition of the retaining valve is a vital one to roads operating heavy grades. It can

be brought about only by the co-operation of all railways. The cleaning and lubricating date must be made to comprehend cleaning and testing the retaining valve as well as the remainder of the brake apparatus. In fact, it should embrace all work needed to put the entire brake apparatus in good order. Retaining valves located in positions that prevent their handles being operated when the train is running should be properly located. The valve should be firmly secured to the car in a vertical position and not immediately below some projecting portion that will interfere with the ready removal of the case or cap. Not only should good unions be employed, but only the best gasket rubber should be used in them. The brake cylinder and reservoir should be so secured to the car as to reduce to a minimum the probability of their coming loose. By suitable bending a limited amount of flexibility should be provided in the retaining valve pipe, near the triple. The pipe should have no unnecessary joints, nor be run where it is liable to be damaged from chafing or blows. It should be well secured underneath, as well as at the end of the car, by an ample number of good clamps. All old 10-pound retaining valves should be removed for examination and only such returned to service as have the key, the weighted valve, and the seat of the latter in good order, and not such until after the bearing of the valve has been reduced to that of the modern type, the large retaining exhaust ports have been soldered up, and a new $\frac{3}{8}$ in. port has been drilled.

All valves in service should be required to pass the following test: Following the application and release of the triple valve it should be impossible, one minute after the exhaust ceases at the retaining exhaust port, to move the brake shoes by a push with one's foot on the end of a brake beam, and a strong exhaust must follow when the retaining valve handle is turned down at the end of the same period of time.

While the modern valve is intended to retain about 15 lbs., yet under fair conditions its value can be greatly increased. To accomplish this requires a quick recharge and reapplication. The quick recharge is possible only where the preceding reduction is not too heavy. This necessitates holding comparatively short distances between recharges.

The difficulty in promptly and accurately locating existing defects without more or less elaborate tests, increases the cost of brake maintenance. The thermal or wheel temperature brake test offers a simple solution of this wherever a train has been held down a heavy grade. The comparative temperature of the wheels indicates the relative amount of work done by each brake. The cold wheels indicate those that have done nothing; the wheels with the chill off, but much cooler than the average, those that have done very little braking; and the wheels far above the average of the train indicate the brakes that have done too much. There is no more simple or accurate test for the entire brake apparatus nor one that will so surely indicate a retaining valve that is holding either too little or too much. Either car or train men can make this test. Whenever practicable it should be employed and all defective brakes so found should be repaired or carded before being allowed to pass on.

Owing to the great weight of the modern freight engine tender, the fact that it is braked high and the closeness of its brake to the main reservoir, the use of the retaining valves on such when holding long trains down heavy grades is liable to cause overheating of the wheels. Where experience confirms this condition we do not believe it is desirable to use the tender retaining valve.

As will readily be understood, the use of the standard retaining valve with a brake having either a 10-in., 12-in. or 14-in. cylinder results in the valve becoming more effective. The larger volumes cannot reduce so rapidly through the $\frac{1}{8}$ in. retaining exhaust port. This has proven detrimental when holding down very steep grades and recharging frequently. The auxiliary reservoirs would recharge more rapidly than the pressure could fall in the 12-in. and 14-in. cylinders, resulting in an undesirably heavy brake application. In a few instances where the speed was very low wheels were slid. This trouble is unusual, but a lesser one is not infrequently noticeable on grades of about 2 per cent.; slowing down is followed by a loss in time, owing to the slow reduction in brake cylinder pressure. The same cause results in a slight delay when, after a stop on the descending grade, it is desired to start. The remedy for both of these troubles is, with 12-in. and 14-in. cylinders, to use $\frac{1}{2}$ -in. pipe from the triple valve to the retaining valve, and to enlarge the retaining exhaust port in latter to $\frac{3}{8}$ in. Such valves should be stamped S $\frac{3}{8}$ in., meaning the special valve with the $\frac{3}{8}$ in. port.

The wide vestibule created a demand for a special design of retaining valve, one that, while located outside, could be operated from inside of the vestibule. Such a valve is now furnished when specified.

(To be Continued.)

Criminal Liability for an Accident.

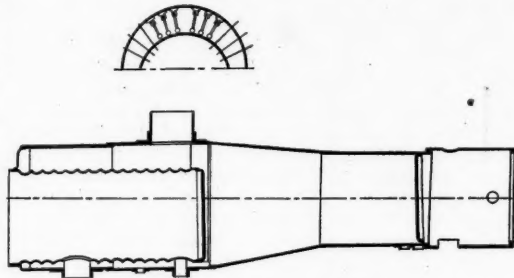
Last October there was a collision near Heidelberg by which nine passengers lost their lives and 115 were injured. It was due to a youth of 21 who, besides attending to signals, had some work to attend to in the ticket office, and, moreover, entertained a friend that day by showing him about the station. It was his duty when he signaled a train to come into the station to enter its number in a book, and not to signal another to enter until he knew that the last entered had left. That was a busy Sunday afternoon, however, and two local trains in succession he neglected to enter in the book; and when an express came, he gave it line clear, thinking, he said, that it was the local which he had just let in, but had not entered. This local had halted on the track to enable the guards to give out tickets before finishing the trip, and the express caught it there. This young man was tried by the Criminal Court in Heidelberg. He acknowledged the acts above mentioned, said that his superior had given him very little instruction, and that he himself had given too much attention to the office that day and too little to the trains. The prosecuting attorney asked for two years' imprisonment; the court gave sentence for eight months.

The Vanderbilt Locomotive Boiler.

The first locomotive to be fitted with the Vanderbilt cylindrical boiler, in August, 1899, was New York Central 10-wheel engine No. 947, built at the West Albany shops. The engine and boiler were fully illustrated and described in the *Railroad Gazette*, September 1, 1899, page 612. We have several times noted modifications of this first design and their adaptation to a number of other engines, there being now in all 11 locomotives using this boiler and four under construction. In addition to the first engine they are distributed as follows: New York Central, five moguls; Baltimore & Ohio, two consolidation; Union Pacific, two consolidation, and Illinois Central, one 10-wheel fast freight, the last mentioned engine having been finished by the Baldwin Locomotive Works in April and being now exhibited at the Pan-American Exposition. The engines under construction are two 10-wheel for the Missouri Pacific; one consolidation for the Buffalo, Rochester & Pittsburgh, and one

and would have sufficient strength. Before the work of building began the Strong boiler, having two cylindrical furnaces and a cylindrical combustion chamber in front, and also the several attempts to use a single flue in Germany, were looked up as matters of record. The former did not seem to the designer to offer the advantages of a single large flue and the German attempts were found to have failed. These German boilers were built under the Lentz patent for an entirely stayless boiler, the Lentz patent having relation to the disposal of front and rear course sheets as gussets so as to avoid using any backhead or any stays for the front tube sheet; that is, the central portion of the boiler has the greatest diameter and from either end of the central portion the sheets slope to the front tube sheet and to the rear end of the boiler. The front tube sheet is entirely stayed by the flues and there is no backhead, the course sheet terminating at the rear end of the fire-box. This design shows serious defects, especially in the lack of steam space and restricted area of disengaging surface,

cluding the combustion chamber, which is simply a clear space between a brick arch at the forward end of the grates and the back flue sheet, the thickness of steel in

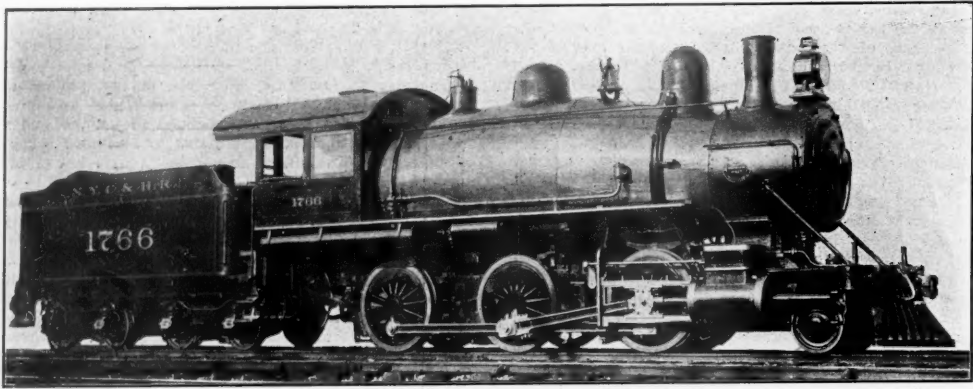


The Original Vanderbilt Boiler.

the fire-box shell being $\frac{3}{4}$ in. This was the largest corrugated furnace ever rolled and was made by the Continental Iron Works, Greenpoint, Brooklyn. It was tested under an external pressure of 500 lbs. per sq. in. before being put in the boiler and it is carried at its front end by a row of radial sling stays and supported at its rear by the backhead. The grates extend 7 ft. 9 in. from the rear end to a bridge wall which is inclined by half-round iron resting in one of the corrugations. On top of this there is a brick arch and the inside of the backhead is also lined with firebrick. This arrangement forms the combustion chamber and also causes the gases to be drawn through the lower tubes. The axis of the rear portion of the boiler shell is inclined toward the rear downwardly. This allows a lower fire-door and also causes better draught through the lower tubes, as it permits the front end of the grates and the brick arch to be lower. The fire-box is placed eccentrically in the rear portion of the boiler, its axis being inclined toward the rear downwardly with respect to the axis of the shell. The following results are from a road test of this locomotive on one of its first trips in regular freight service:

Road Test of New York Central Engine No. 947.

Mean temperature, atmosphere	78 deg. F.
Feedwater temperature	71 deg. F.
Wind	Light, unfavorable
Condition of rail	Good, dry
Exhaust nozzle	Double, $\frac{3}{4}$ -in. tip
Left West Albany	9.45 a. m.
Arrived at DeWitt	6.00 p. m.
Elapsed time	8 hours 15 minutes
Number of slow downs	6
Time lost by detentions	1 hour 24 minutes
Running time	6 hours 51 minutes
Distance	140 miles
Speed, miles per hour, running time	20.4
Coal used, actual	12,390 lbs.
Water used	12,290 gals.
Water used	107,571.6 lbs.
Evaporation per lb. coal	8.6 lbs.
Evaporation per lb. coal from and at 212 deg. F.	10.3 lbs.
Wt. train, tons 2,000 lbs., excl. engine and tender	924.495 tons
Weight of train, incl. engine and tender	1,054.495 tons
Train	.60 light, 1 load, 1 caboose



Baldwin Mogul Locomotive With Vanderbilt Boiler—New York Central.

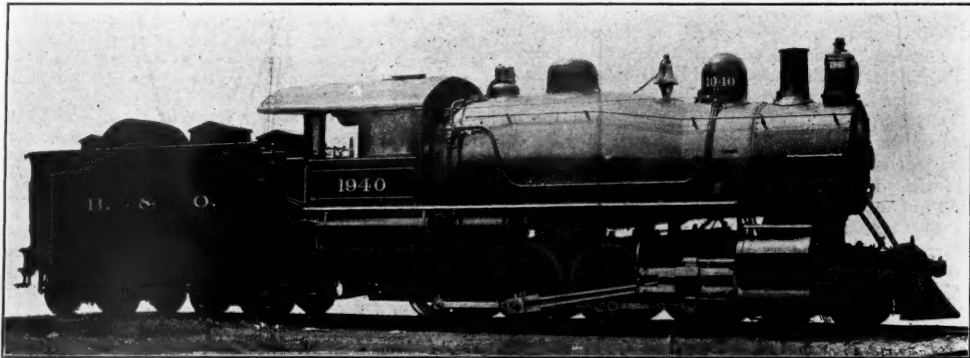
consolidation for the Chicago Great Western. It is also known that more will be built.

We mentioned on April 26 that an Atlantic type engine had been designed to use the Vanderbilt boiler and it is expected that such an engine will presently be built by the Baldwin Locomotive Works. We are now informed, on good authority, that the Vanderbilt boiler has aroused German interest in the subject; that the German Government instructed its consular agent in railroad matters in the United States to make an official report on the subject; that this report has been made and that it was favorable to the design.

The paper, "Locomotive Boilers," read by Mr. Cornelius Vanderbilt at the junior meeting of the American Society of Mechanical Engineers, January 8, was noted in the *Railroad Gazette*, January 11, page 23. It reviewed the development of locomotive boiler design, giving special attention to boiler stays and the extent to which they are destroyed in regular locomotive operation; defined the purpose of and showed various adaptations of the Vanderbilt boiler, and also gave records of service tests of locomotives having this type of boiler. The paper, with illustrations from the drawings shown by lantern slides at the time of its presentation, has just been published by the Baldwin Locomotive Works as their "Record of Recent Construction, No. 23." From the illustrations in the catalogue we have made simple diagrams showing differences in contour and proportions referred to in the extracts from data and description given herewith. Half-tone illustrations from photographs of New York Central mogul engine No. 1766 and Baltimore & Ohio consolidation engine No. 1940 show engines of the heavier classes as they appear when equipped with the Vanderbilt boiler.

The boiler was designed primarily to overcome the staybolt problem, it being the idea of the designer that

and to overcome this Lentz applied an auxiliary dome on the rear course and in some designs connected it with an outside steam pipe to the main dome on the central portion of the boiler. In some of these German designs a far more serious defect was found, namely, in order to lower the fire-door the fire-box was bent, the axis of the front portion being parallel to the rail and the axis of the rear portion inclined downwardly and rearwardly. To make such a fire-box it was necessary to build it up of two separate sections and to weld the joint between them. This left a space of 6 in. or so on the top, without any corrugations to assist in its support, and the fire-box was weakest where it should have been strongest. The inevitable result followed the use of such a boiler; that is, the fire-box collapsed and the boiler exploded. This explosion, coupled with the fact that no



Baldwin Consolidation Locomotive With Vanderbilt Boiler—Baltimore & Ohio.

Engines With Vanderbilt and Standard Boilers.

Dimensions and Weights.	Vanderbilt	
	Stand. Mogul. boiler.	No. 1,753. No. 1,766.
Diameter of cylinder, inches	20	20
Stroke of cylinder, inches	28	28
Diameter of driving wheel, inches	57	57
Weight on truck, lbs.	20,700	20,200
Weight on No. 1 driver, lbs.	45,000	42,300
Weight on No. 2 driver, lbs.	47,000	54,200
Weight on No. 3 driver, lbs.	43,500	50,800
Weight, total, lbs.	156,200	167,500
Largest diameter of boiler, inches	73 $\frac{3}{4}$	88
Smallest diameter of boiler, inches	66	67 $\frac{1}{4}$
Number of tubes	396	517
Diameter of tubes, inches	2	1 $\frac{3}{4}$
Length of tubes, inches	146 $\frac{1}{2}$	135
Tube heating surface, sq. ft.	2,323.6	2,585
Fire-box heating surface, sq. ft.	185.6	135
Total heating surface, sq. ft.	2,509.2	2,720
Grate area	30.3	33
Steam pressure carried, lbs.	185	190
Diameter of exhaust nozzle, inches	5 $\frac{1}{4}$	5 $\frac{1}{4}$

if a cylindrical fire-box could be introduced in the locomotive great saving in repairs would result. The allowable clearances, the position of the boiler with respect to the wheels, the allowable weights and the grates and space above them, to provide for the large amount of coal which must be burned per square foot of grate were all duly considered in the design. Investigations showed that a fire-box 59 in. internal diameter and made of $\frac{3}{4}$ -in. steel plate with Morison's corrugations, could be rolled

particularly good results were noticeable in the use of these boilers, put an end to the employment of cylindrical fire-boxes in European locomotives. That no particularly good results were obtained is due, in the author's opinion, to the simple fact that the fire-boxes were too small to allow sufficient space above the grates for the proper mingling of the gases, and the small combustion chambers were also entirely inadequate for this purpose. Fire-boxes about the size employed in marine boilers were used, but without sufficient combustion chambers to give space and properly consume the gases, and the result was unsatisfactory combustion. The American railway clearances and limiting weights allow far larger boilers than those used on European railways, and for this reason cylindrical fire-boxes of very large diameter can be used.

A diagram of the original Vanderbilt boiler is here shown. The total weight of the locomotive is 160,000 lbs., 113,300 lbs. of which is on the drivers and 46,700 lbs. on the trucks. The cylinders are 19 $\frac{1}{2}$ in. x 26 in., and the drivers 61 in. diameter. There are 2,165 sq. ft. of heating surface in the tubes and 135 sq. ft. in the fire-box, a total of 2,300 sq. ft. for a grate area of 34 sq. ft. The fire-box is of the Morison suspension type, internal diameter 59 in. clear, external diameter over the extremes of corrugation 63 $\frac{3}{4}$ in., and 134 $\frac{1}{2}$ in. long, in-

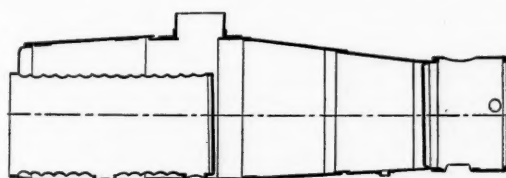
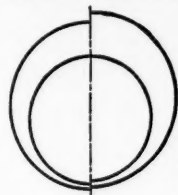
Coal, per car mile	1.43 lbs.
Coal consumed per 100 tons hauled one mile	9.4 lbs.
Tons hauled one mile, per lb. coal	10.4
Tons hauled one mile, per lb. water	1.23
Quality of coal	Clearfield bituminous

This locomotive has been in regular fast freight service on the Mohawk Division of the New York Central since its delivery. After a year's work it was taken in for overhauling and the total cost for all material and repairs during the first year of service was \$1,456.52. This included replacing one driving axle and replacing a backhead casting which was originally put in in a defective condition. During the year 54,650 miles were run, 9,019 cars were hauled west and 7,616 cars hauled east; the small number of cars being due to the fact that it was fast freight service. The cost of repairs per engine mile was 2.66 cents, which is very low in comparison with the average repairs to locomotives, especially when it is considered that this locomotive was to a certain extent an experiment and no doubt had much more time devoted to it than was actually necessary. The cost of repairs of all engines on the New York Central during the same year was 3.76 cents per engine mile and on the Mohawk Division was 3.97 cents. This of course includes all the old as well as the new locomotives and cannot be used for exact comparison.

As a result of the success of this first boiler five more

locomotives with Vanderbilt boilers were ordered by the New York Central in November, 1899, and were delivered in May and June, 1900. Three of these were built at the Schenectady Locomotive Works and the other two at the Baldwin Locomotive Works. These are moguls with some slight differences between those built by Baldwins and those built by Schenectady. The criticism had been made in the original boiler that there was not a sufficient distance from the upper gage water-level to the throttle, and that therefore wet steam resulted. Although this was disputed it was thought advisable to increase the distance between the top of the fire-box at its front end and the top of the outer shell. Therefore the maximum diameter of the boiler is very great, 88 inches, and to save weight the front and rear courses slope toward the smoke-box and backhead respectively, the straight course which was used in the original boiler being omitted because of the decrease in allowable length. This modification was suggested by the Baldwin Locomotive Works and this design approaches the Lentz design, but the backhead is stayed with longitudinal cross-foot stays.

The cylinders of these moguls are 20 in. x 28 in., and the drivers 57 in. in diameter. The Baldwin engines weigh 167,500 lbs., 147,300 lbs., of which is on the drivers. The Schenectady engines weigh 170,000 lbs., 145,000 lbs. being on the drivers. The heating surface of the Schenectady engines is 2,732 sq. ft. and the heating surface of the Baldwin engines 2,720 sq. ft., the grate area being in each case 33 sq. ft. The boilers carry 190 lbs. working steam pressure and in the Schenectady engines a row of sling stays is used, as in the original boiler, to assist in supporting the front end of the fire-box, but these stays were left out of the Baldwin engines, the weight of the furnace being taken on the casting which surrounds the hole in the combustion chamber. A diagram of a Schenectady boiler is shown herewith. These five engines have been in regular service on the Hudson Division of the New York Central since their delivery. The results of two runs of the Baldwin locomotive No. 1766, equipped with Vanderbilt boiler, are given in comparison with work done by engine No. 1753, equipped with ordinary boiler, and it is seen that the balance is in favor of No. 1766. The weights and dimensions of the engines and the conditions under which the tests were made are given in accompanying tables. The engines were run from Albany to New York under usual conditions, except that they were turned at New York with



Vanderbilt-Schenectady Mogul Boiler.

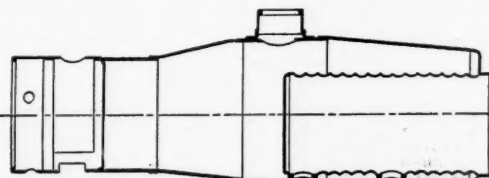
little delay, thus making the run as nearly as possible a round trip. The service conditions for one engine were duplicated as closely as possible for the other engine in each run.

It is seen that the running conditions were very unfavorable to engine No. 1766, in that the delays were more frequent and of greater duration than those of engine No. 1753. Between the delays the engine was worked so hard that the demands upon the boiler were variable and fluctuating, the most unfavorable conditions under which a test can be conducted. Notwithstanding this the cylindrical fire-box engine consumed 3.68 lbs. of coal per h.-p. hour on one test and 3.96 lbs. on the other, an average of 3.82 lbs.; whereas the standard boiler consumed 4.04 lbs., showing a saving of 5.4 per cent. in favor of the Vanderbilt boiler. This saving is, in a measure, due to the larger grate area and heating surface of engine No. 1766. These larger surfaces should have lowered the smoke-box vacuums and temperatures, but such results were not obtained because of the fact, previously stated, that the engine with the newer type of boiler was worked harder than the one with the older type of boiler. But that the cylindrical fire-box form of boiler is more efficient than the ordinary is shown by comparison of the economic evaporation of both boilers. The average result in the two tests of the Vanderbilt boiler is 8.85 lbs. of water per lb. of coal from and at 212 deg. F.; and in the standard boiler 8.56 lbs., a gain of .29 lb. for the cylindrical fire-box type. Both engines developed 1 h.-p. for each 4 1/4 sq. ft. of heating surface and steamed freely, carrying their water well.

The consolidation locomotives for the Union Pacific and the Baltimore & Ohio were ordered shortly after these five moguls. Diagrams of the boilers for both roads are here shown. In these designs the increased length permits the use of a front course of small diameter and does away with the sloping front course into the smoke-box. Transverse sections of one of these boilers are also shown. The cylinders of the Union Pacific engines are Vauclain compound, 15 1/2 in. and 26 in. x 30 in. The drivers are 57 in. diameter, with a total wheel base of 23 ft. 11 in., of which 15 ft. 3 in. is rigid. The total weight is about 196,000 lbs., with 174,000 lbs.

on the drivers. The boilers carry 190 lbs. working steam pressure and there are 2,629 sq. ft. of heating surface, 135 sq. ft. of which is in the fire-box. There are 384 2-in. tubes 12 ft. 6 in. long.

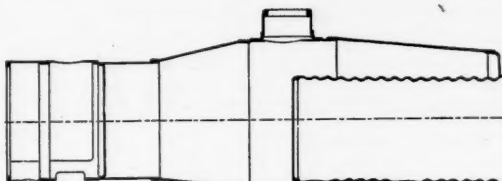
The Baltimore & Ohio engines also have Vauclain compound cylinders 15 1/2 in. and 26 in. x 30 in., but the driving wheels are 54 in. diameter, with a total wheel base of 23 ft. 8 in., 15 ft. 4 in. of which is rigid. The total weight is 193,000 lbs., with 170,800 lbs. on the drivers. In these engines the boiler is shorter and there are 500 tubes 1 3/4 in. diameter and 11 ft. 6 in. long, hav-



Vanderbilt-Baldwin B. & O. Consolidation Boiler.

ing a heating surface of 2,615 sq. ft. in the tubes, which, with the 135 sq. ft. in the fire-box, gives a total of 2,750 sq. ft.

One of the objects in building the Union Pacific engines was to determine whether this form of boiler was not more satisfactory for bad water than the staybolt form. Therefore, as soon as they were delivered they



Vanderbilt-Baldwin U. P. Consolidation Boiler.

were placed in regular service on the division on which the worst water is encountered. Up to the present time all reports as to their work and operation have been most satisfactory. All indications point to a material decrease in the cost of maintenance in such a form of boiler, for there seems to be but little to balance the present cost of repairs and renewals due to the staybolts.

eighteen inches in diameter, four inches deep, made of 3/4 inch steel plate with one-inch iron stay bolts placed four inches on centers. Repeated applications of a pressure of 100 pounds were made for twenty-four hours, the pressure being held by an automatic apparatus for an interval of six seconds, and at the rate of 350 applications per hour. A pressure of 200 pounds was similarly applied for twenty-four hours, after which the pressures were increased by increments of 50 pounds. After the test under 350 pounds had been conducted for thirteen hours, the staybolts started to leak; this continued for the remaining eleven hours. After a pressure of 400 pounds had been applied for four hours, the heads began to crack and continued to crack for twenty hours. At 450 pounds pressure for eight hours, a complete rupture occurred by the head stripping from one of the center staybolts. The drum contained twelve bolts, and at the end of the twenty-four hours under 450 pounds, all of the heads were damaged to a greater or less extent.

From experiments conducted under the Bureau of Steam Engineering, United States Navy in 1879, it was determined that bolts driven with spherical heads were from 23 per cent. to 36 per cent. stronger than those driven with the usual conical head. Slightly more metal was used for the spherical heads, though how much is not stated. This would indicate that after a few years' service there would be a decided decrease in the strength of a flat stayed surface from the fact that the rivet head would be gradually diminished in size from the repeated hammering incident to keeping the end tight.

The Baldwin tests indicate that a flat-sided fire-box 3/4 inch thick with one inch stay-bolts spaced four inches on centers, which is a fair average for modern fire-box dimensions, would rupture at a pressure of 450 pounds, after a certain definite number of applications of gradually increasing pressures.

From Morison's experiments on his furnaces at the Leeds Forge in 1891, he found that a fire-box 3/4 inch thick collapsed under a continuous pressure of 1340 pounds. The formula deduced from his experiments shows that under repetitions of stress, the strength in the case of cylindrical flues depends not on the ultimate strength of the material, but upon the modulus of elasticity. This, unlike the ultimate strength, is not diminished by repeated applications of stresses. The formula derived from experiments gives a factor of safety of 5.96 for a Morison furnace 3/4 inches thick and 59 inches internal diameter. Comparing this result with that obtained from the Baldwin experiments, we find that a firebox such as has been applied to the locomotive boilers previously described is over twice as strong under

COMPARATIVE TEST OF VANDERBILT AND STANDARD BOILERS.

	Engine No. 1,753 Standard Mogul.	Engine No. 1,766 Vanderbilt boiler.	Engine No. 1,766 Vanderbilt boiler.
Fuel—Pounds.			
Consumed on run.....	28,870	31,560	30,400
Consumed per hour, running time.....	2,392	2,431.4	2,403.2
Water—Pounds.			
Total water evaporated on run.....	202,550	224,890	233,088
Water consumed, per hour.....	16,785.9	17,325.9	18,425.9
Equivalent weight evaporated from and at 212° on run.....	246,908.45	274,590.60	285,066.87
Equivalent weight evaporated from and at 212° per hour.....	20,462.01	21,154.9	22,527.0
Boiler, horse-power.....	593.27	613.36	653.14
Economic Evaporation—Pounds.			
Water evaporated, per pound of coal, on run.....	7.02	7.12	7.66
Equivalent evaporation from and at 212°.....	8.56	8.69	9.01
Rate of Combustion—Pounds.			
Coal burned, per sq. ft., grate surface.....	951.86	956.36	921.21
Coal burned, per sq. ft., grate surface per hour.....	78.88	73.68	72.82
Rate of Evaporation—Pounds.			
Water evaporated, per sq. ft. heating surface.....	80.72	82.64	85.69
Water evaporated, per sq. ft. heating surface per hour.....	6.69	6.37	6.77
Water from and at 212°, evaporated, per sq. ft. heating surface per hour.....	8.15	7.77	7.93
Square feet heating surface, per horse-power.....	4.21	4.43	4.16
Time Data.			
	South. hrs. m.	North. hrs. m.	South. hrs. m.
Running time.....	5 53	6 11	7 16
Total time on road.....	8 05	10 35	17 50
Delays.....	2 12	4 24	10 34
Train Data.			
	Nov. 14, 1900.	Nov. 15, 1900.	Nov. 16, 1900.
Date.....	1900.	1900.	1900.
Train.....	2 Ex.	N. B. 3	6 Ex.
Number of loaded cars.....	39	40	40
Number of empty cars.....	1
General Data.			
Average steam pressure, when developing power, pounds.....	173.	177.	180.
Average smoke-box vacuum when developing power, inches water.....	4.5	5.3	5.2
Average smoke-box temperature, degrees.....	721.	734.	741.
Average temperature of feed water, degrees.....	50.	50.	50.
Average speed under headway.....	25.1	26.3	23.

It is also apparent that the fire-box can be renewed in much less time and at much less cost than the stayed type. There should also be less difficulty in keeping the flues tight by reason of the protection afforded by the combustion chamber and because of the uniformity in the expansion of the fire-box. There is, of course, more fire-brick to be renewed, but this is a comparatively small matter. As regards the weight of a cylindrical fire-box boiler compared with a narrow fire-box boiler, a comparison of the total weight on engine per sq. ft. of heating surface shows in the case of the two mogul engines, previously compared, that the engine with the Vanderbilt boiler is slightly lighter than the standard.

The rest of the paper is given to some valuable tests of bolts with spherical or conical heads, made by the Bureau of Steam Engineering, U. S. Navy, in 1879; and tests by the Baldwin Locomotive Works in 1897, to determine the effect of repeatedly applied loads on flat stayed surfaces and on cylindrical flues. This further matter is good and valuable reading and it is briefly extracted here, some of it being comparison with experiments on Morison furnaces in 1891:

In the Baldwin test, pressure was applied to a drum

repeated stresses as the ordinary flat stayed type.

As regards the other forms of corrugated fireboxes, a comparison of the various types is interesting. Taking the Morison as 100 per cent.; the relative strength per square inch of the Fox section is 91.82 per cent.; for the Purves, 89.55 per cent.; for the Adamson, 75.86 per cent.; for the Holmes, 72.93 per cent.; and 67.51 per cent. for the Farley Spiral Flue.

A proper estimate of the advantages of the Vanderbilt boiler over those of the present type can only be appreciated after the first two years of service. Comparisons made then will, in the inventor's opinion, justify the advocated departure from the present type of screw-bolted fireboxes in use almost exclusively since the advent of the locomotive.

An Italian railroad company is to pay \$80,000 for a leg. It is not an Italian leg, however, but one formerly attached to Gen. Buffin, who was chief of the special embassy which the King of the Belgians sent to Rome to represent him at the funeral of King Humbert, and who, with many others, as he was returning the day after, was a victim of the frightful accident at Castel Giubileo.



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EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

ADVERTISEMENTS—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.

During the month of April we noted in our news columns orders for 11,915 cars and 286 locomotives, which may be compared with 3,580 cars and 161 locomotives ordered in the corresponding month last year. So far each month this year has shown a big increase over the orders placed in the same time last year. The April car orders are divided as follows: Box, stock and refrigerator cars, 6,673; coal and ore cars, 4,636; flat cars, 395; tank cars, 13, and passenger cars, 198.

A committee of the Western Railway Club, appointed to report on the revision of rules of interchange for freight cars, recommend that all reference to the use of link and pin couplers be eliminated from the rules. The significance of this recommendation recalls with renewed force the facts which underlie it. These have already been presented and are generally understood, but we are not likely too often to be reminded of them. It was in 1888 that the Executive Committee of the Master Car Builders' Association announced standard contour lines for the vertical plane coupler, and it was not until 1891 that limiting gages were adopted which would serve in enforcing the requirements of this standard. These were the starting points for a new practice. In ten years more than a million cars have been equipped with the new coupler; the older forms have become outlawed; they have practically disappeared from interchange service, and now, if the recommendation of the Western Railway Club is accepted, even their names are to be legislated from the code. The transformation is a remarkable one from whatever point of view it may be considered and its achievement reflects great credit upon the management of American railroads.

The Illinois Central announces a plan for paying pensions to its employees, to go into effect July 1 next. We have already printed descriptions of the plans of the Pennsylvania and the Chicago & North Western. A copy of President Fish's circular, omitting only commonplace details, is printed in another column of this issue. It will be observed that there are a number of features in which this plan differs from those of the other two roads named.* Employees 70 years old must be retired, but they do not get a pension unless they have worked for the company 10 years. Trainmen and certain other classes of employees working outdoors may be retired at 65, regardless of their physical condition; employees of all classes may be retired when over 60, if incapacitated. Rule 12 states specifically that a person dismissed from the service, even if off as long as a year, will, if reinstated, be considered as having been contin-

uously in the service. Assignment of pensions is forbidden. With inexperienced persons the age limit for new employees is the same as on the Pennsylvania and the North Western, but experienced men may be taken on even as old as 45. The number of persons employed by the Illinois Central at the present time is over 30,000. A press despatch of Monday last says that the 8,000 employees in the forty-three shops of this road have just been granted an increase of 5 per cent. in wages, to take effect from May 1. It is said that this action of the company, with the pension plan, increases the yearly expenditure of the company by about \$400,000.

A Cuban General, Lacroix Morlot, has telegraphed from Cuba to his representative, Gen. A. G. Greenwood, in New York city, as follows:

"Have entered formal protest before notary against Van Horne and employees responsible for violation Foraker law. Have the announcement published there." General Greenwood said of this: "General Lacroix Morlot is a member of the Convention now forming the Cuban Constitution, and he is amazed that the United States Government should assist Sir William Van Horne against the people of Cuba, for that is what the Government is doing. Van Horne is buying a strip of land through Cuba for the construction of a railroad, which will be built chiefly with foreign capital, and he claims that, as the railroad will be constructed on his own land, it is a private enterprise. But he will build bridges across rivers, and do other things of similar character, in distinct violation of the Foraker law, which is still active, and which provides that during the occupation of American troops in Cuba no one has the right to give concessions to build railroads, etc. This is a right which is to be vested in the people of the island of Cuba, and not by the United States Government or any other body." The significance of this is that General Morlot and Cubans of his sort are reluctant to have rights granted and great works begun before they get control of the Government. We do not say that their motives are nefarious; they may be most patriotic and honorable; but we point out that the ascendancy of those people in Cuba would bring suffering for the island and international complication. And everybody knows, who knows anything, that the railroads must be built by "foreign capital" if they are built at all. We have already explained at considerable length (*Railroad Gazette*, Jan. 25) what Sir William Van Horne is doing and the conditions under which he is doing it. It is enough to say now that he is doing an inestimable work for the peace, prosperity and growth of the island. The development of his plan will be a railroad from one end to the other of the island, together with branches and harbors and the opening up of great tracts of land for cultivation. It is quite true that he cannot get franchises permitting him to cross highways and streams, owing to the action of the Foraker resolution, but he gets provisional permits from the present Governors, and it is probable that the civil and military power of the United States will prevent the nullification of these permits. It does not take much imagination, however, to see the troubles which may arise unless our Government is prompt and resolute.

State Railroads and Freight Rates.

Prussian authorities have been pointing with pride to the fact that since the virtual completion of the State Railroad system in 1880 the average rate received per ton per mile has been reduced from 1.507 cents to 1.284 cents, or 17 per cent. A Berlin newspaper notes that the freight traffic of 1899 at the rates of 1880 would have yielded the State Railroads some \$36,000,000 more than their actual freight earnings, and it congratulates German industry that it does not have to pay the 2.217 cents per ton-mile which it quotes as the average paid at a leading French manufacturing center. From this, it says, it is plain how much more advantageous a State railroad system is for the production of a country than a private system.

This newspaper neglects to confirm its statement by the experience of the United States. We take the liberty to supply its omission. By the census of 1880 the railroads of the United States are shown to have had a freight traffic of 32,349 millions of ton-miles, for which they received an average rate of 1.29 cents per ton per mile. In 1899 they had 123,667 millions of ton-miles, carried at the average rate of 0.724 cent per ton per mile, a reduction of 44 per cent. The amount of the reduction per ton-mile in the 19 years was 0.566 cent here, against 0.223 cent in Prussia, and our average in 1880 was almost exactly the same as the Prussian average in 1899.

The American average rate of 1880 applied to the traffic of 1899 would have yielded just about \$700,000,000 more than the actual freight earnings in that year (which, by the way, is more than six times the amount of dividends paid that year), which may be set against the \$36,000,000 "saved" to the Prussian shippers by the rate reduction there. The amount of freight traffic in this country increased 280 per cent. in these 19 years, while the population increased 53

per cent., so that we may reasonably claim that the prevailing railroad policy has not stifled industry.

All of which indicates that, however well German industry has thriven under State railroad management—and it certainly has thriven wonderfully—a State management is not always and everywhere indispensable to progress in industry, in the art of transportation, and to the reduction of rates. There is no doubt that the Prussian State Railroad management has done good work and deserves a great deal of credit, and probably it would have done more if local interests and prejudices had not prevented; but we claim that it has not done all the good work in the railroad field, and that here on this side of the Atlantic private railroad management has attained results not to be ashamed of.

Annual Reports.

Mexican Central.—The twenty-first annual report of the Mexican Central Railway Company, Limited, is for the year ending Dec. 31, 1900. In that year the gross earnings (Mexican currency) amounted to \$17,223,878, the increase over the preceding year having been 10.4 per cent. The operating expenses increased, however, about 14 per cent.; thus the increase of net was only \$174,589. The net earnings amounted to \$5,373,684. Gross and net per mile operated increased over the preceding year, the average miles worked having been 2,054. The mileage of the company on Dec. 31 amounted to 2,124 miles, plus 227.5 miles of sidings.

The increase from freight earnings was \$1,405,772; other items did not increase greatly, but the freight is 80 per cent. of all of the traffic of this road. The President estimates that the gain in gross earnings would have been larger but for the falling off in exports and the depreciation in silver which caused a stringency in the money market. A table of gross earnings from 1885 to 1900, inclusive, is printed which shows that the gross commercial earnings increased in that period 379.88 per cent., while the earnings per mile worked increased 188.69 per cent. At the same time the miles of road increased 66.22 per cent. In fact, every year for the last eight years the gross commercial earnings have increased considerably faster than the miles worked. During the year 1900 forty-eight manufacturing enterprises were established along the lines of the Mexican Central, excluding the City of Mexico and mining. The list of these shows a wide diversity of industries.

The development of the Tampico Harbor has also continued to act to add to the business of the road. The depth of the channel entering the harbor now is 23.7 ft. on the outer bar and 30 ft. on the old inner bar. The exports for 1900 were much greater than through any other port or gateway, having been (Mexican currency) \$40,000,000 in 1900, as compared with \$25,440,000 at Vera Cruz and \$17,235,000 at El Paso. The imports (in gold) amounted to \$10,368,000 at Tampico, \$21,991,000 at Vera Cruz, \$5,550,000 at El Paso, \$5,878,000 at Eagle Pass, and \$6,733,000 at Laredo. The Mexican Central has thus early made Tampico the chief port of Mexico, so far as bulk of freight is concerned. In 1900 at that port 505,427 metric tons were imported and 142,836 exported, while Vera Cruz, until recently substantially the only Gulf port of Mexico, imported but 310,567, and exported 73,319 tons. Vera Cruz, apparently, still is the chief port of entry for European manufactures, as the value of its imports is twice as great as those of Tampico, though so much less in weight. The exports at both ports are what would be called insignificant here.

In operating expenses the heaviest increase was in transportation and traffic, but maintenance of equipment increased \$424,321 and maintenance of way and structures \$151,412. This latter increase was due to heavier replacements of rails and ties and renewals of bridges and culverts. Since rail renewals were begun in 1896 over 19 per cent. of the total miles operated has been relaid and in the last two years the renewals have been in 75-lb. rails. Since 1895 wooden bridging to the amount of 38,855 ft. has been either filled or replaced with iron pipe, stone culverts or steel bridges. At the end of 1900 the company had still in service about 50,000-ft. of timber trestle, of which 11,556 ft. was ballasted deck trestle. Of the total freight equipment 94.3 per cent. is air-brakes and 56 per cent. automatic couplers. The report gives the average weight on the driving wheels of locomotives for each of the past 11 years, which illustrates the progress made on many American railroads in that time. In 1890 the average was 62,007 lbs. for 139 locomotives; in 1900 it was 99,578 lbs. for 252 engines. Most of the progress has been made since 1896, when the average was 69,317 lbs. In like manner the average capacity of the freight cars is given for each year. It was 16.48 tons per car in 1890, 19.55 tons in 1896, and 25.17 tons in 1900. Of the whole addition to the stock of cars since 1890, only 269 had been acquired down to 1896, and 1,479 since that year. The additions have been chiefly 30-ton cars.

In November the Minister of Public Works appointed a commission for revision of tariffs, a fact which we noted at the time. This commission is composed of two lawyers, one government railroad inspector, one government director, one representative from the Department of Communications and Public Works, two delegates from the railroad companies, one delegate from the Chamber of Commerce and one delegate from the Agricultural Associa-

* *Railroad Gazette* Dec. 22, 1899; Nov. 2, 1900; Jan. 11, 1901.

tion. Only the five members first mentioned have a right to vote in the commission, although all may take part in discussion.

The size, color and style of the letters in signs are little features in railroad working which are not without their influence on the comfort of passengers. On the Pennsylvania Railroad the signs around the stations are now made with a peculiar wine color or dull red (nearly or quite the same as the Tuscan red on the standard passenger cars), which is quite distinctive and yet is as quiet as one could wish for. In some cases the letters are gilt, on a wine-colored ground, while in others the letters themselves are of the latter color with various backgrounds. The names and numbers on the doors—or, rather at the side of each door—in the general office building at Philadelphia are of this or a similar color, but very dull, on a natural wood background. These door-signs are so quiet as to be almost sleepy, yet they seem to be bold enough for all practical purposes. It is very easy to make a mistake in the attempt to introduce quietness in a sign, for if the painter carries the notion a bit too far the main purpose of the sign is defeated; but the Pennsylvania people appear to have kept on the safe side. Signs on conductors' and brakemen's caps appear in many cases to be so inconspicuous, from native lack of character, as to be practically almost unreadable, and in need of radical reformation. The letters on the caps of the brakemen on the Chicago, Burlington & Quincy, which are solid white, about half an inch high, are excellent for their purpose. They are of silver braid on black silk. We have in mind another road which has adopted white letters, but has not made them large enough. A brakeman's badge, like his oral announcements, is designed for the benefit of the most utter strangers and, like his enunciation, should go to the extreme of distinctness. The passenger generally has only one or two seconds in which to read a badge (or to hear the name of a station when it is shouted), whereas he can take six seconds, if he desires, to read a sign on a door. A brass or a gold plated badge shows that the wearer probably is an employee, but beyond this it is usually good for nothing but ornament; and nickel plate or silver is but little better. It is probably safe to say that 90 per cent. or more of all passenger train men's badges are practically illegible to passengers, except under the most favorable conditions of position and light, and the passengers have to distinguish the conductor from his brakeman by the difference in his uniform or in his "style." The Burlington badges cost, with a border of quarter-inch silver braid all around, 87 cents each; and the visor cord costs 35 cents more, making the trimmings of a cap cost \$1.22. This is nearly ten times the cost of a common metal badge, but the officers of the road seem to think that the more costly one is worth the money.

It is reported in an Altoona newspaper that the police department of the Pennsylvania Railroad is preparing for a "wholesale" campaign against ride stealers; that within the last few weeks this class of free passengers has increased very fast. It is said that the police officers find their greatest annoyance in the cases of young men and boys who ride short distances, as from a small village to the nearest large town or city. These persons are more intelligent than the ordinary tramp and often in some respects more reckless. When necessary, to enable them to get off from a train they apply a number of brakes (and, of course, leave them on), so that at the next up-grade the train is stalled. The tramp who rides from one end of a division to the other, and whom the brakemen can conveniently overlook, makes less trouble; if he is injured or killed he has no friends to make a disturbance, whereas the injury of a boy near his home arouses widespread sympathy. To facilitate and simplify the work of the Police Department the superintendents of the Pennsylvania, at least on some divisions, have notified employees that they must not ride on either freight or passenger trains, except in the discharge of their duties. The newspapers of New York State also inform us that the Erie road is preparing to "clean out" the vermin along its line. The Erie is said to be a favorite route with those tramps who are just now steering toward Buffalo, with a view to "taking in" the exposition, or the people who are so busy in attending to the fair that they have not time to watch their hen-roosts. The Erie has had its police force pretty well organized for several months past, and we may expect to see on that road a repetition of the good record which has been made for several years on the Pennsylvania lines west of Pittsburg, with which the readers of the *Railroad Gazette* are familiar. The Erie has divided its territory into 12 districts, and the district chiefs of police are, nearly all of them, men who have had considerable experience and have been employed by the company in one capacity or another for years. G. W. Douglass, late of the Jersey City detective department, has been made superintendent of the entire force. Arrangements have been made whereby the local police of the various cities and towns along the line of the road will co-operate with the railroad police.

The Mexican International Railroad, which was an enterprise of the late C. P. Huntington, and connects with the Southern Pacific at Eagle Pass, 169 miles west of San Antonio, and extends in a generally southwestern direction, crossing the Mexican Central at Torreon, 518

miles south of El Paso, to Durango, 540 miles, will make a new transcontinental railroad when extended about 160 miles from Durango to Mazatlan, which is but little south of the southern point of Lower California. In Mexico, however, Pacific railroads do not count for much, and with all the new railroad built there since 1880, only one, the Tehuantepec Railroad, in the far south, reaches the Pacific coast. And the Mexican International, with this short interval separating it from the sea, has given its energies to building branches in the interior where population and production promise more traffic than an extension to the sea, though such an extension would, by means of coasting steamers, have access to all Pacific ports of Mexico. The International has been building from its southwestern terminus at Durango, not in the same general direction to the sea, but at right angles to it, northwestward, parallel to the coast and separated from it by two ranges of mountains; it has 307 miles of branches, in eight different lines, which show the company's estimate of the value of Mexican local traffic as compared to transcontinental. This road last year earned in Mexican currency at the rate of \$6,710 a mile, worth at the average rate of exchange \$3,154 in American currency. These are light earnings, but this sum left net earnings of \$1,251 gold a mile; and as the fixed charges seem but about \$600 a mile, there was a considerable surplus. A very light traffic will support a railroad with fixed charges so low. The company, however, has issued income bonds to the amount of about \$5,000 per mile; but as the interest is payable only when earned and is not cumulative, it does not add to the fixed charges.

The New York Legislature has passed a new law forbidding ticket brokerage, and the Governor has signed it. This act (Bill No. 1273) was introduced by Assemblyman Everett. The substance of it is contained in a single section; it amends Section 38, Chapter 676, of the railroad law, so as to forbid any person to sell or offer to sell a railroad or steamboat ticket unless he is an authorized agent; and no person is an authorized agent unless he has written authority, specifying his town, street and street number; general passenger agents are forbidden to supply tickets for sale to any persons other than authorized agents. It will be remembered that a law passed in 1897 to suppress ticket scalping was sustained by the Supreme Court of the State early in 1898, but later (November) was annulled by the Court of Appeals (*Railroad Gazette*, April 1 and Dec. 2, 1898). We gave the substance of this law on May 28, 1897. Its main section was similar to that which is now again enacted, except that it did not contain the clause forbidding general passenger agents to supply tickets to unauthorized persons. It contained other sections allowing a ticket agent to buy and sell again, as for example, the agent of the Union Pacific in New York city, to buy tickets for his passengers to get them from New York to Omaha; and one stipulating in detail how and when railroads should redeem unused tickets. The promoters of the present law evidently believe that the condemnation of the law of 1897 was based principally on the clause permitting certain agents to buy and sell tickets of roads other than those by which they were employed, and therefore that the new law will stand the test of any attack which the scalpers may make upon it. The new clause forbidding railroads to sell to the scalpers is an excellent one in principle; but the enforcement of it is, of course, another story.

The electric railroads of Michigan are going to test in the courts the authority of the Commissioner of Railroads regarding crossings of electric and steam roads. The law of that State provides that no crossings of this nature shall be made, except with the approval of the Commissioner, and that in all cases where reasonably practicable, they shall be made otherwise than at grade. Acting under this law, Commissioner Osborn refuses to approve any grade crossings of electric tracks with the main lines of standard railroads. He says that the expense of grade separation is very little if any more than the expense of the installation of suitable interlocking appliances, and a bridge having once been installed, the expense of maintenance is very trifling as compared with the cost of maintenance and operation of the mechanical appliance. By separating the grades, all possible danger of accident is avoided, and this is impossible at a grade crossing, no matter how perfect the mechanical appliances may be. The cost of one accident, liable to occur at any time at a grade crossing, may be more than the entire expense of grade separation the whole of a road and, moreover, it is to the financial interest of the electric companies themselves to have all grades separated. The Jackson & Suburban Traction Company has asked the Supreme Court of the State for a mandamus requiring the Commissioner to show cause why an order recently made by him for a grade separation in the city of Jackson at a crossing of that line with the Michigan Central should not be set aside. The suit is based on the claim that the control of streets is vested in the cities and villages by their charters, and that an act attempting to vest such authority in a State officer is invalid. This writ was returnable this week.

The New York, New Haven & Hartford Railroad Company is now carrying passengers between New York City and Providence, R. I., 188 miles, for 50 cents each.

To read this item about a transportation company which is supposed to possess a great monopoly will make some people rub their eyes; but it is not so very strange, after all. The company, as the reader knows, has a "marine district"; and not only that, it has two classes of boats. Following the example of the Pullman people in classifying its sleeping cars on the lines West of the Missouri River, the New Haven has standard steamers and ordinary steamers; and the latter, which were put on last year as a separate line, carrying passengers at 75 cents and \$1, to meet the opposition of the new and independent "Joy line," proved so profitable that the company has reduced the fare still lower. These low-price boats now run each way six times a week, instead of three times as formerly. President Hall says that these low water-rates not only proved profitable in themselves, without diminishing the profits of the old Providence Line, with its \$3 rate, but also swelled the receipts from fares on the cars between Providence and Boston. In this rail traffic the company gets, of course, considerable business from the opposition boat line as well as from its own steamers. The passengers who patronize the low-rate steamers are not paupers by any means; they engage staterooms as freely as on the regular lines. Even with a stateroom, the rate is less than a cent a mile; and two persons in one room get the ride and the room for a dollar a head.

In the year ending Dec. 31 last, the New York, Chicago & St. Louis, with an operated mileage of 512 miles, earned gross \$7,000,000 and net \$1,331,000. The increase in gross over the preceding year was 1.5 per cent. and the increase in net 10.7 per cent. After paying fixed charges there was a balance of \$477,000 and dividends were paid to the amount of \$470,000 on the first and second preferred stock. The freight earnings of this road amount to nearly 83 per cent. of its total earnings, but its freight rate is remarkably low. It received in 1900, per ton per mile, 0.478 cent as against 0.468 in 1899, and yet the road earned gross \$13,428 per mile and net \$3,170. It gets a long average haul, namely, 297 miles, but its average trainload is only moderate, 279 tons.

NEW PUBLICATIONS.

Directory of Directors in the City of New York. New York: The Audit Company, 43 Cedar street. 1901. This is, we believe, the third annual publication of the directory compiled by the Audit Company and is dated March 1, 1901. It consists of two portions, first an alphabetical list of those persons with New York City addresses who are directors or trustees, followed by the names of companies with which they are connected; and second, alphabetical lists of corporations in banking, insurance, transportation, manufacturing and other lines. The names of the corporations are accompanied by the names of the companies' principal officers and directors. This second part contains principally New York City companies, but many new industrial corporations have been introduced, the general offices of which are not in New York City. When the first edition of this compilation appeared various people (among others one of the staff of the *Railroad Gazette*) amused themselves with trying to find the man who was director in the greatest number of concerns and with giving a few names of men who were many times directors. It seems hardly worth while to repeat that performance; once is probably enough, but the list remains as useful and as interesting as ever.

The Manual of Statistics; Stock Exchange Handbook. 1901; 23rd year. Henry E. Wallace, Editor. Octavo, 812 pages. New York: Charles H. Nicoll, 220 Broadway. Cloth, \$5.

The 23rd edition of this recognized manual is just issued. It covers railroads, industrial securities, street railroads and statistics of grain and provisions, cotton, mining, petroleum and particulars of banks and trust companies. In the body of the book each corporation is briefly reviewed with an abstract of its corporate history, of its present financial status and of its working organization and directorate. This gives ready reference to a great number of companies which are alphabetically arranged. There is also an alphabetical index of 16 pages by which the companies and the statistical tables may be readily found. Among these tables are the highest and lowest prices of stocks and bonds traded in on the exchange of various cities, covering three years in New York and two years in other towns. There are voluminous tables of mining statistics, tables of prices of all products of agriculture, tables of quantities of grain, cotton, etc., giving production, shipments, exports and various other information.

Interstate Commerce Commission; Tenth Annual Report. Washington, D. C.

The last annual report of the Commission was issued Dec. 24, 1900, and an abstract of it appeared in the *Railroad Gazette* of Jan. 11 and 18. This report is now issued in permanent form. The appendix containing the points decided by the Commission since its organization fills 150 pages. There is also a short appendix containing the statistics of casualties to railroad employees, which formerly were given only in the Statistician's report; and there is a third appendix, not heretofore given, in which are lists of all the formal and informal complaints filed with the Commission during the year. The notes of the formal complaints fill 2½ pages while those of the informal, which take only one or two lines each, fill about six pages.

Movable Coal Conveyor.

Where coal is brought to the consumer in gondola cars, the cost of unloading is usually a serious item. The Robins Conveying Belt Company have offered two solutions for this problem, both of which can be seen in operation in Chicago. The first installation was at the power plant of the South Side Elevated Railroad Company, where fixed conveyors were built alongside the railroad track. Running in opposite directions, they both deliver the coal into the same hopper, from which it is fed into a cross conveyor and carried into the storage bins.

A more novel arrangement is that at the Harrison Street Station of the Chicago Edison Company. Here, fixed conveyors could not be considered, as it was necessary to keep the yard clear for handling machinery. To meet these conditions, the Robins Company built the machine of which we show an engraving from a photograph. The conveyor is mounted on a movable frame-

The J. S. Toppan Co., of Chicago, the railroad agents for the Kennicott Water Softener Co., has opened offices in New York at 26 Cortlandt street, and will be represented there by its treasurer, Alex. Holland.

H. F. J. Porter, formerly manager of the Chicago office of the Bethlehem Steel Company, and more recently at the works at South Bethlehem, has been appointed New York Sales Agent of the Company, with headquarters at No. 100 Broadway.

The Standard Pneumatic Tool Co. has appointed James H. Manning, formerly Master Mechanic of the Union Pacific at Cheyenne, Wyo., its Western Manager with offices at San Francisco, where a complete line of "Little Giant" pneumatic tools and appliances will be carried in stock.

Mr. T. H. Symington has resigned his position as Superintendent of Motive Power of the Atlantic Coast Line Railroad in order to market some patented journal boxes and dustguards of his own design. The business will be

The Standard Paint Company, 100 William street, New York, makers of the P & B products, have made an interesting experiment in using Ruberoid for floor covering. One of their old offices in John street was, years ago, floored with Ruberoid. When the company moved to William street the old Ruberoid floor carpet was found to be in such condition as to warrant its transfer to the new quarters, where it is now doing duty, apparently as good as new after years of service. It makes a pleasant walking surface, being more elastic than wood or oil-cloth, and deadening the sound. It seems to be water, acid, alkali and vermin proof and is odorless and easily kept clean.

Iron and Steel.

It is estimated that since the advance of \$2 a ton on standard sections of rails was announced, orders for over 300,000 tons have been placed with the rail mills.

The Rail Department of the National plant of the U. S. Steel Corporation at Youngstown, Ohio, will be closed and that department added to the plant of the Illinois Steel Co.

At annual meeting of Passaic Rolling Mill Co., May 6, the following organization was effected: W. O. Fayerweather, President and Treasurer; A. C. Fairchild, Vice-President; Jas. B. Cooke, Secretary; John K. Cooke, General Manager.

In a bill before the Canadian Parliament to incorporate the Clergue Iron & Nickel Steel Co., of Canada, the name has been changed to the Algoma Iron & Nickel Steel Co., and the capital has been fixed at \$20,000,000, with power to increase to \$30,000,000.

The Marion Iron Works has been incorporated in Washington, with a capital stock of \$10,000, to acquire and continue the engine, boiler and machine business heretofore conducted in Tacoma, Wash., by J. C. Ollard, Wm. Ollard and H. D. Ollard.

The Standard Crucible Steel Co. is reported to have secured about 20 acres of land for a plant near the Schoen Works in McKees Rocks, Pa., and is applying for a charter with a capitalization of \$1,000,000. Beside making crucible steel, the company proposes to make car springs.

The number of directors of the National Tube Co. has been decreased from 23 to 9. The present directors are: F. J. Hearne, E. C. Converse, William Nelson Cromwell, William J. Curtis, Charles Steele, William B. Schiller, William H. Latshaw, J. D. Culbertson and A. S. Matheson. The executive offices will be moved to Pittsburg.

Owing to the determination of the United States Steel Corporation to concentrate all operating departments of the constituent plants at Pittsburg, Charles M. Jarvis, Vice-President in charge of the operating department of the American Bridge Company, has resigned, as he does not care to change his residence from New England.

The American Bridge Company will furnish the Illinois Central R. R. with about 3,000 tons of steel for all the bridge work on this railroad during 1901. The bridge company has a contract from R. H. Hood & Co. for the structural steel for the New York Central & Hudson River R. R. shed to be built on Pier No. 59, North River. This will require over 1,000 tons of steel work.

Rails for Queensland.

According to recent press despatches from Melbourne, the Queensland Government will receive bids for large quantities of 42 and 61-lb. rails for new railroad.

Rolling Stock for Russia.

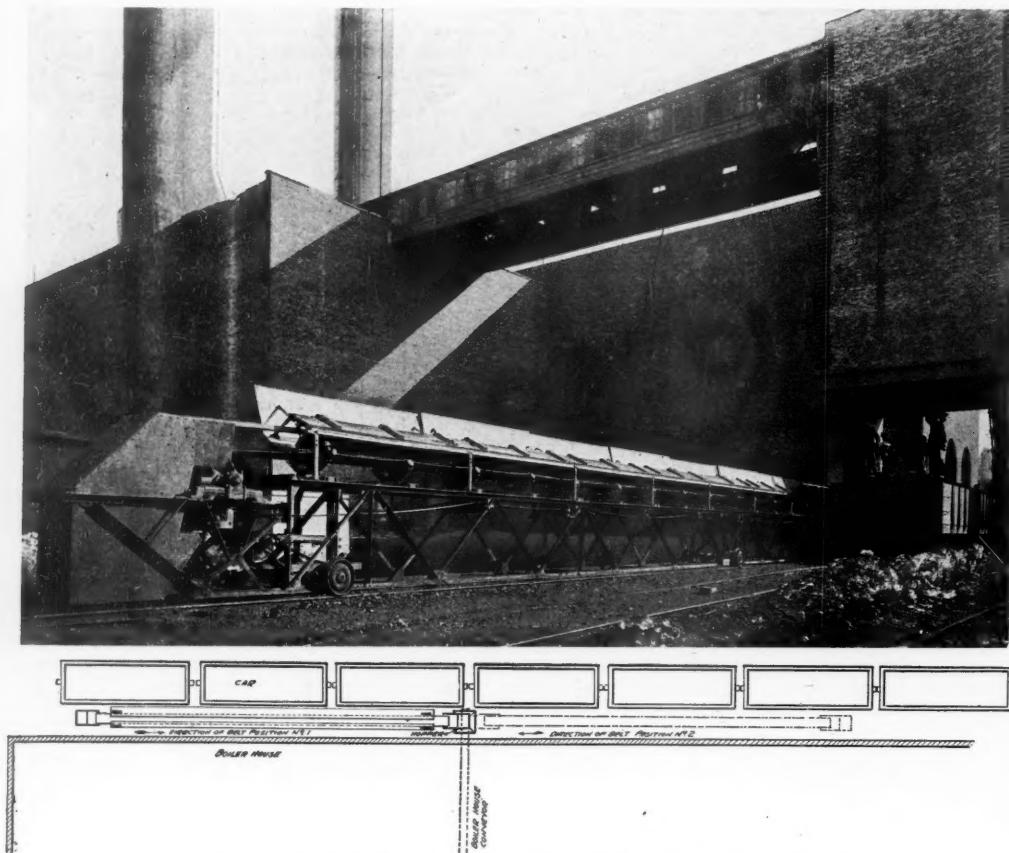
St. Petersburg newspapers announce that the Ministry of Transportation will give out contracts for new rolling stock this year amounting to \$22,500,000: \$10,000,000 for locomotives, \$9,000,000 for freight cars, and \$3,500,000 for passenger cars.

Locomotive Consolidation.

Up to Wednesday of this week newspaper reports tell us that Mr. Joseph Leiter has bought the Richmond Locomotive Works for \$3,000,000; that this is denied; that the International Power Co. has bought the Cooke Locomotive Works, of Paterson, and that the Rogers Locomotive Works have been bought by Messrs. Smith & Haloran. Other despatches say that the International Power Company has tried to get the Schenectady Locomotive Works, but has failed. Others say that the Schenectady, Pittsburgh, Brooks and Dickson Works are to be included with those mentioned above in a great combination. Concerning all this we can say very little other than that we know that negotiations have been in hand by some thoroughly responsible financial people for a consolidation of locomotive works. We are not yet at liberty to mention names. It is probable enough that Mr. Leiter, who is said to have bought the Richmond Works, is working on the same lines as the International Power Company, as he was one of the active organizers of that company.

The Allis-Chalmers Company.

A consolidation of leading makers of engines and mining machinery which has been under consideration for some time, has been effected under the above title. The consolidation comprises the following concerns: Edward P. Allis Co., Milwaukee; Fraser & Chalmers, Chicago; Gates Iron Works, Chicago, and the Dickson Manufacturing Company, Scranton, Pa. It is proposed to incorporate under the laws of New Jersey, with a capital



Plan showing position of boiler house, coal cars and two positions of movable conveyors.

A Robins Movable Coal Conveyor.

work, which is 90 ft. long and about 4 ft. high and supported on three sets of wheels, which run on a narrow gage track. One electric motor serves to drive the conveyor and also to move the entire machine forward and backward. The method of using the conveyor is illustrated by the photograph and diagram, the dotted lines in the latter showing that the coal from six cars can be carried to a common point without its being necessary to shift the cars.

Apart from the convenience and economy of space gained by this arrangement, there must also be noted the large capacity and the small expenditure of power. This point is brought out by the following figures, which are the results of tests made by the engineers of the Edison Company: To drive the conveyor running empty requires 3¾ h.p. To drive it when it is loaded by 14 men scooping from the cars at the rate of 67½ tons per hour, 4½ h.p. is required, and to move the entire apparatus takes 5½ h.p.

From the diagram, it will be seen that when the conveyor is moved to the second position, the direction of the belt's motion is reversed. This is accomplished with a reversing switch at the motor. To move the frame along on its track, power is communicated to the driving wheels through a friction clutch at the end of the conveyor furthest from the motor; the conveying belt being used to transmit the power.

This conveyor was built under the supervision of Messrs. Sargent & Lundy, consulting engineers of the Chicago Edison and many other electric companies.

TECHNICAL.

Manufacturing and Business.

The Bordo Valve Co. will move on May 15 its main offices and works to Coatesville, Pa. The change is made because the business of the company has outgrown present facilities.

The cars of the Pressed Steel Car Company, exhibited at the Buffalo Exposition, are coated with "Protectus," which is the new material designed to prevent rust, and is not affected by sulphurous acid.

carried on under the name of T. H. Symington & Co., at 702 Fidelity Building, Baltimore, Md.

The H. W. Johns Manufacturing Co. have taken a number of important contracts lately for asbestos coverings. Among these are insulation under the protected deck of the steamship Illinois, all of the high pressure and heating lines of the Atlantic Mutual Building, New York City, fire felt coverings for the Syracuse Rapid Transit Co., etc.

Frank W. Thomas, for several years Inspector and Engineer of Test for the Norfolk & Western, and until recently Mechanical Engineer for Fitz-Hugh & Co., Chicago, has been appointed Master Mechanic of the Stillwater & Mechanicville Street Railway, a high speed trolley line running from Troy, N. Y., to Lake George with a branch to Saratoga Springs.

The Jones protective coating, made by the Jones Protective Coating Co., 1456 Monadnock, Chicago, has been specified for the Rialto elevator to be erected at South Chicago by the Macdonald Engineering Co., Chicago. Also, it has been specified for elevators for the Rosenbaum Grain Co., South Chicago, Churchill & Co., Buffalo, N. Y., and for the Cincinnati, Hamilton & Dayton, at Toledo, Ohio.

The Pressed Steel Car & Wheel Co., with a capital stock of \$700,000, has been incorporated in Canada by James H. Mitchell, John A. Currie, Neil McLean, Alexander Macdonnell and Arthur C. McMaster, all of Toronto, Ont., who are also directors. The company, according to its charter, is empowered to make pressed steel cars, car wheels, railroad equipment, etc., and as a contractor, to build ships, bridges, elevators, etc. The office of the company is in Perth, Ont.

A partnership has been formed by B. M. Gardner, formerly of the Iron Trade Review, and C. R. Robinson, formerly with Singer, Nimick & Co., under the firm name of Gardner & Robinson. The office of the firm is at 1522 Monadnock Building, Chicago. They will represent the following companies in Chicago: Seaboard Steel Casting Co., Chester, Pa.; Acme Steel & Malleable Iron Works, Buffalo, N. Y.; Wallace Machine & Foundry Co., Lafayette, Ind., and the New Brighton Steel Co., New Brighton, Pa.

stock of \$25,000,000 preferred and \$25,000,000 common, of which \$16,250,000 is preferred and \$20,000,000 common will be issued. The directors of the new company are: Edward D. Adams, New York; Charles Allis, Milwaukee; Mark T. Cox, Orange, N. J.; James H. Eckels, Chicago; Elbert H. Gary, New York; William A. Read, New York; James Stillman, New York; William W. Allis, Milwaukee; Frank G. Bigelow, Milwaukee; W. J. Chalmers, Chicago; Wm. L. Elkins, Jr., Philadelphia; Henry W. Hoyt, Chicago, Max Pam, Chicago; Edwin Reynolds, Milwaukee, and Cornelius Vanderbilt, New York. Mr. Julian Kennedy, of Pittsburgh, has valued the various plants as follows: E. P. Allis Co., \$5,120,000; Fraser & Chalmers, \$3,205,000; Dickson Manufacturing Co., \$1,200,000; Gates Iron Works, \$410,000. The Locomotive Department of the Dickson Co. is not included.

Consolidation of Shipbuilding Companies.

Announcement was made on Tuesday by H. W. Poor & Co., of the plans for consolidating several shipbuilding companies. The new company is to be known as the United States Shipbuilding Company, and its authorized capital is to be \$65,000,000, equally divided between seven per cent. non-cumulative preferred stock and common stock. It is proposed to acquire the following properties: The Newport News Shipbuilding & Dry Dock Company, Newport News, Va.; The Union Iron Works, San Francisco; The Bath Iron Works, Limited, and the Hyde Windlass Company, Bath, Me.; the Crescent Shipyard and the Samuel L. Moore & Sons Company, Elizabethport, N. J.; the Canda Manufacturing Company, Carteret, N. J. The plants have a total annual capacity of 380,000 tons, exclusive of general repair, dockage and collateral work. The aggregate of orders now on hand of the constituent companies exceeds \$63,000,000, covering an average of 18 months for completion, on which the estimated profit is over \$7,000,000. As soon as the United States Shipbuilding Company is duly organized the entire capital stock will be issued and delivered to the Mercantile Trust Company, as depository. The following are to be among the directors of the company: Henry T. Scott, President of the Union Iron Works; Lewis Nixon, Crescent Shipyard; Charles J. Canda, President of the Canda Manufacturing Company; John S. Hyde, President of the Hyde Windlass Company; E. W. Hyde, President of the Bath Iron Works, Limited; C. B. Orent, President of the Newport News Shipbuilding & Dry Dock Company; H. E. Huntington, First Vice-President of the Southern Pacific Company; Irving M. Scott, Vice-President and General Manager of the Union Iron Works; Edwin Hawley, President of the Minneapolis & St. Louis Railway; E. H. Harriman, Chairman of Board, Union Pacific Railroad, and James Stillman, President of the National City Bank, New York. For the purpose of carrying out the plan as above outlined, \$20,000,000 of preferred stock is offered at par, subscribers to receive with preferred stock so taken an equal amount of common as a bonus.

THE SCRAP HEAP.

Notes.

A press despatch from Muskegon, Mich., says that the fare on all of the street railroad lines of that city is to be reduced from 5 cents to 4 cents.

The Boston & Maine has ordered 50,000 plants with which to adorn the grounds around its stations. This is said to be the largest order of the kind ever given in New England.

The freight houses in the city of Augusta, Ga., will hereafter, by permission of the State Railroad Commission, close their doors at 3 o'clock on Saturday afternoon. A majority of the business men of the city joined in a petition to the Commission for this object.

The practical consolidation, for purposes of operation, of the New York Central and West Shore roads, between Albany and Buffalo, has been carried one step farther, by the issue of an order to conductors and enginemen of the New York Central to "learn the road" of the West Shore; so that a train can at any time be transferred from one line to the other without having to stop to get a pilot.

A Pennsylvania paper says that the Pennsylvania Railroad will soon have its own wires for long distance telephone transmission all the way from Philadelphia to Pittsburgh. The company already has a circuit throughout the length of the Middle Division, Harrisburg to Altoona, 132 miles, and there are a number of stretches on the division west of Altoona. The division east of Harrisburg has telephone wires for much more than half its length already.

The Railroad Commission of Massachusetts, in a letter to the Governor, expresses its disapproval of special legislation by which a street railroad company is granted the right to carry freight, except where good cause is shown; there have been numbers of cases in which special acts have been passed but where it does not appear that the company is prepared to actually begin a freight business. The companies applying are simply aiming to have the freight franchise ready in case it shall in the future be found desirable to use it. The Commissioners do not believe that the Legislature should grant general permission to carry freight over tracks on the streets of cities and towns, certainly not at present.

Traffic Notes.

On Sunday, April 28, the Southern Pacific carried 2,214 passengers from Houston, Tex., and points near by, to the Beaumont oil wells.

The State of Texas has been defeated in its suit against the Texas Midland to recover a very large sum in penalties for violation by the road of the State Railroad Commission's regulations for dealing with cotton at compresses.

The Chicago reporters say that freight rates are unsettled, both east and west of that city, though the accounts give no particulars as to the size of the reductions or what classes of traffic are affected. On the western lines the weakening of rates is due, it is said, to a lighter movement of merchandise westbound.

The Wabash recently announced a reduction of \$1.95 in the fare from Kansas City to New York; and after a prodigious amount of discussion and threatening the other lines met the reduction. The Wabash then, of course, made a further reduction of \$1.95 (to \$27.10); and there the matter rested at last accounts.

The final decision of the Pennsylvania Supreme Court, sustaining the anti-scalper law, has been followed by the settlement of a number of long-pending suits against six scalpers of Pittsburgh whom the railroads had been prosecuting. Five of the scalpers readily yielded and were fined only \$5 and costs each; the sixth was more obstinate and was fined \$50 and costs. The Pittsburgh Press says that ticket scalping in that city is now a thing of the past.

The Lake Shore & Michigan Southern has reduced from 3 cents a mile to 2 cents the passenger fares on its main line in Michigan from Ottawa Lake to White Pigeon, and on the lines from Monroe to Lenawee Junction, and from Lewanee Junction to Jackson. Newspaper accounts state that this reduction would have been required by the law of Michigan at the beginning of next January, but that the company has decided to make the reduction at once.

R. P. I. Alumni.

The New York Alumni Association of the Rensselaer Polytechnic Institute had its annual meeting and dinner in New York the evening of May 3. President Ricketts was the guest of honor and a large company was assembled. Prof. George W. Plympton, of Brooklyn, was re-elected President of the Association.

I. C. C. Decision on Carload Deliveries in Brooklyn.

The Interstate Commerce Commission, in an opinion by Chairman Knapp, has announced its decision of the case of Palmer's Dock, etc., against the Pennsylvania Railroad. The complainant claimed that the Pennsylvania Railroad violated the law by discontinuing the delivery of hay in carloads at its freight station in Brooklyn, N. Y., after making such delivery for a period of years. The Commission rules that a railroad is not in every case under legal compulsion to furnish the same terminal facilities for all descriptions of traffic; that it is sufficient if reasonable provision is made in this regard, and what is reasonable in a given case depends largely upon the conditions and surroundings. Transportation between the company's terminal in Brooklyn and its rail terminus in Jersey City is by water across New York harbor, and the discontinuance of "track delivery" for hay at Brooklyn, though it was continued for other carload traffic, was done to relieve a state of chronic congestion at that station resulting largely from consignments of hay thereto. The company still continues delivering carload hay alongside wharves in Brooklyn as it does at other points within the lighterage district of New York. The Commission decides that the resulting discrimination against hay in carloads was not "unjust" within the meaning of the act, and that as no violation of the regulating statute is shown, the complaint should be dismissed.

LOCOMOTIVE BUILDING.

The Southern Missouri & Arkansas is about to make contracts for two locomotives.

The New Zealand Government Railways are having six engines built by the Baldwin Locomotive Works.

The Richmond Locomotive Works, on May 3, shipped 12 16-in. x 24-in. 10-wheeled passenger locomotives to the Finland State Railways, Helsingfors, Finland. These locomotives are duplicates of 10 engines built by the Richmond Works for the Finland State Railways during last year and is the third order received from that country.

CAR BUILDING.

The N. K. Fairbank Co. is in the market for about 10 tank cars.

The Macon, Dublin & Savannah has specifications out for 250 coal and 250 box cars.

The Empire Construction Co. is having 50 freight cars built by the Haskell & Barker Co.

The Cleveland Provision Co. is having two freight cars built by the American Car & Foundry Co.

The Alabama Great Southern has ordered 100 box cars from the American Car & Foundry Co.

The Southern has placed an additional order with the American Car & Foundry Co. for 75 furniture cars.

The Butte, Anaconda & Pacific has ordered 100 double hopper ore cars of 100,000 lbs. capacity from the Pressed Steel Car Co.

The Pennsylvania, which we noted last week as being in the market for 33 passenger cars, has, it is reported, placed the order with the Jackson & Sharp Co.

The Louisville, Henderson & St. Louis has ordered 25 coal cars of 80,000 lbs. capacity and three stock cars of 60,000 lbs. capacity from the American Car & Foundry Co.

BRIDGE BUILDING.

AKRON, OHIO.—City Engineer J. W. Payne is making plans and specifications for a bridge of 46-ft. span and 40 ft. wide over the Ohio Canal at Cherry street, to cost about \$7,000.

ALBANY, N. Y.—The Governor has signed the bill appropriating \$17,000 for a bridge over the Cattaraugus Creek on the Indian Reservation.

AMHERST, WIS.—We are told that the Wisconsin Cen-

tral proposes to build a bridge over the Waupaca River at Waupaca or Amherst Junction, but plans are not decided upon.

ANDOVER, N. B.—Bids are wanted, June 17, for the substructure of the bridge proposed over St. John River between Andover and Perth. A. R. Wetmore, Provincial Engineer, Fredericton, N. B.

ASBURY PARK, N. J.—The Board of Chosen Freeholders has decided to appropriate \$20,000 for a steel bridge over Sunset Lake at Grand avenue, between Asbury Park and North Asbury Park.

BOSTON, MASS.—Wm. T. Pierce, Engineer for the Metropolitan Park Commission, informs us that the bridge for which the Park Commissioners will open bids on May 13, will be of concrete-steel arches over Neponset River, and cost about \$50,000. (May 3, p. 305.)

BOWLING GREEN, KY.—The County Auditor informs us that no new bridge will be built but only temporary repairs made to the bridge over Portage River on the county line.

BRISTOL, TENN.—The contract for the two bridges on Main street is let to the American Bridge Co.

BROCKVILLE, ONT.—We are told a steel bridge is proposed over Jones' Creek, near Brockville. Address O. K. Fraser, of Brockville.

BROWNSVILLE, IND.—The County Commissioners have appropriated \$10,000 for a bridge over Whitewater River about two miles south of this place.

CAPE GIRARDEAU, MO.—The Arkansas Railroad has contracted with the Phoenix Bridge Co. for one 180 ft. steel bridge over the St. Francois River; also one 150-ft. skew and two spans of 50-ft. plate girders, all on stone piers across Beak River. See Southern Missouri & Arkansas, in Railroad Construction column.

CHICAGO, ILL.—Bids are wanted, May 22, instead of May 8, as advertised, for the substructure and superstructure of the Randolph street bridge over the Chicago River. Alex. J. Jones, President of the Board of Trustees, Sanitary District.

CINCINNATI, OHIO.—The City, according to report, proposes to build a bridge over the canal at Star street, for which plans are being made for a structure to cost about \$4,000.

CLEVELAND, OHIO.—The Grade Crossing Commission is considering plans proposed by the city and the railroad companies for elevation of the tracks through Cleveland, to do away with the grade crossings. It is proposed to begin the work in the southern part of the city and work northward. The Pennsylvania and Erie railroads are said to be willing to pay 65 per cent. of the expenses.

DARTMOUTH, MASS.—A bridge is under consideration to cross Padanaram River at Smith's Neck.

FORT WORTH, TEXAS.—The Texas & Pacific is reported to have submitted a proposition to the committee of the City Council relative to building the Jennings avenue viaduct. It is proposed to build a structure 600 ft. long, with two approaches, each 300 ft.

FULTON, N. Y.—The wooden bridge over the canal near the Oswego Falls Pulp & Paper Mills collapsed on April 25. We are told that a new bridge will probably be built by the canal company.

GONZALES, TEXAS.—The Commissioners' Court of Gonzales County will receive bids, on May 16, for one double-track steel bridge across the Guadalupe River, and also 10 small bridges of steel over creeks in different parts of the county.

GRAND RAPIDS, MICH.—The Pere Marquette R. R. has contracted with the Detroit Bridge & Iron Works for three 150-ft. through double-track truss spans, and one 50-ft. double-track girder for its new bridge over the Grand River at Grand Rapids.

HARTFORD, CONN.—The New York, New Haven & Hartford has a bill before the Legislature for permission to build a new bridge over the Connecticut River at Hartford.

HOLYOKE, MASS.—James L. Lighe, City Engineer, informs us that bids will probably be wanted in a few weeks by the Board of Public Works for a combination iron and steel bridge, 142 ft. long, over the second-level canal, at a cost of about \$8,000.

HUNTSVILLE, ALA.—The Madison County Commissioners have accepted plans for a steel bridge over Paint Rock River at New Hope.

IRON MOUNTAIN, MICH.—The Chicago & Northwestern railroad bridge at Loretto, near here, was destroyed by fire, May 1.

LIBERTY, IND.—The County Council of Union County has appropriated \$10,000 for a bridge at Honeyman's Ford. It is stated bids are now wanted.

LOCKLAND, OHIO.—Bids are wanted, May 11, for a bridge over Mill Creek in Sycamore Township connecting Davis street with Clark street, in Reading. Geo. C. Zimmerman, Clerk Board of County Commissioners, Cincinnati.

MANSFIELD, ILL.—The Highway Commissioners want bids, on May 11, for three bridges in Blue Ridge Township. N. S. Ketchum, Champaign, Ill.

MILWAUKEE, WIS.—The Common Council is considering issuing bonds for the proposed viaduct over the railroad tracks on Kinnickinnick avenue which will be about 1,750 ft. long.

MINNEAPOLIS, MINN.—We are informed that the Great Northern Ry. is preparing plans for rebuilding the Fourteenth avenue, S. E., bridge over their tracks from a 20-ft. footbridge to a wagon bridge with 40-ft. roadway, and two 20-ft. sidewalks.

MUNCIE, IND.—A new bridge 30 ft. long will be built over Muncie Prairie Creek, near Whitely. Plans have been made.

NEW YORK, N. Y.—The Board of Aldermen has passed an ordinance authorizing an issue of bonds to begin work on the foundations for the Blackwell's Island bridge, known as Bridge No. 4.

The contract for the steel suspension work on the new East River Bridge was awarded on May 2 to the Pennsylvania Steel Company, at their bid of \$1,123,400. This contract will probably be the last one let by the present commission, as on Jan. 1, 1902, the East River Commission will be legislated out of existence by the new charter.

NIAGARA, WIS.—The Legislatures of Michigan and Wisconsin have each passed a bill authorizing a bridge

over the Menominee River between Niagara, Wis., and Quinnesec, Mich.

OSWEGO, N. Y.—The Department of Public Works, according to report, has adopted plans and specifications for a new approach to the east end of the lower bridge, to cost about \$12,000.

PHILADELPHIA, PA.—The Pennsylvania R. R., according to report, is having plans made for two additional bridges over the Schuylkill River north of Market street. Mayor Ashbridge, in a letter to the Councils, last week urges the Board to make immediate appropriation for repair and maintenance of bridges. The Director of Public Works says that the work will cost about \$150,000.

REMSON, IOWA.—The Illinois Central Railroad and the county propose to build a new bridge in Marion County, the expense to be paid jointly by the county and the railroad.

SEATTLE, WASH.—The Seattle Electric Co., according to report, has plans made for a new bridge over Duwamish River which will cost about \$14,000.

SHARON, PA.—The Sharon-Youngstown Street Ry. Co. has let contracts for the two abutments for a bridge over Yankee Run. Contract for the steel work is not let.

TACOMA, WASH.—The Commissioner of Public Works has two plans under consideration for a bridge over the Puyallup River on the tide flats. One design is for a drawbridge. Major John Millis, Corps of Engineers, U. S. A., Seattle, Wash., has the matter in hand.

TOLEDO, OHIO.—The contract for one of the bridges of the Toledo Terminal Ry. Co. over the Maumee River has been let to the Toledo Bridge Co., at about \$200,000. It will be a steel structure with a draw, the total length being 1,450 ft. This company still has another bridge in contemplation.

TOLEDO, ORE.—Bids are wanted, June 5, for a steel bridge over the Yaguna River at Pioneer. J. H. Lutz, County Clerk.

UTICA, N. Y.—The Common Council has passed a bill providing that the Mohawk River bridges at Park avenue and Genesee street may be built over the present channel, or over the proposed new channel if the excavation of the proposed channel is determined upon before construction of the bridges is begun.

VICKSBURG, MISS.—Bids are wanted, May 15, for three or four bridges to be used on the road to the National Military Park. The largest will be about 400 ft. G. C. Haydon, Assistant U. S. Engineer; W. T. Rigby, Commissioner of Public Works. (May 15, p. 193.)

WACO, TEXAS.—The Citizens' Ry. Co. proposes to build during this year a steel bridge over the Brazos River to East Waco.

WINNIPEG, MANITOBA.—The contract for the steel work on the new Canadian Northern bridge over Red River at this place is awarded to the Dominion Bridge Co., of Montreal.

Other Structures.

ASHLAND, KY.—The Ashland Steel Co., Inc., contemplates building a number of open-hearth steel furnaces in the near future.

BRIDGEPORT, OHIO.—According to reports the directors of the American Sheet Steel Co. have authorized improvements at the Etna-Standard plant which will increase the capacity.

GREENVILLE, PA.—The Bessemer & Lake Erie is about to let a contract for a red brick passenger station on Clinton street which is to be 30 x 72 ft. Work will be begun in about two weeks. The company is considering plans for shops in the same city.

JANESVILLE, WIS.—The Chicago, Milwaukee & St. Paul will build a \$30,000 depot at this place during the summer. It will be of white brick, ornamented with red tile.

MARION, OHIO.—Leffler & Bland, of this place, are building a brick and stone passenger station on Center street, for the Erie, the Big Four and the Hocking Valley railroads. The plans were made by Frank L. Packard, of Columbus, Ohio. The structure will be one story high, 50 x 250 ft., and cost \$25,000.

NEW YORK, N. Y.—Plans for the new Chamber of Commerce building have been made. The site is the old Real Estate Exchange, on Liberty street.

NICETOWN, PA.—The McClintic-Marshall Construction Co., of Pittsburgh, has a contract for about 4,000 tons of structural steel for the new forging plant of the Midvale Steel Co., at Nicetown, near Philadelphia. The price is about \$260,000, and the work is to be finished in about five months.

PHILADELPHIA, PA.—Bids are asked for building a four-story brick and structural steel cold storage building at the Philadelphia Market, Thirtieth and Market streets, for the Pennsylvania R. R., the building to be 112 x 113 ft.

POCATELLO, IDAHO.—It is reported that the Oregon Short Line will begin work at once on its proposed new shops at Pocatello, which will cost between \$500,000 and \$600,000.

READING, PA.—The Philadelphia & Reading has let a contract to Armstrong & Printzenhoff, of Philadelphia, for a warehouse at New Hope, to be 224 x 52 ft.

TEXARKANA, ARK.—The shops of the Arkansas & Choctaw R. R. at this place are finished and will soon be put in operation.

WINNIPEG, MAN.—The Winnipeg Street Ry., according to report, is considering building a new terminal building and repair shop; also an enlargement of the power house, and a car shed about 400 ft. x 135 ft.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xvii.)

New England Railroad Club.

At the meeting of the New England Railroad Club, to be held in Boston on May 14, a paper on "Recent Practice in Interlocking and Block Signaling," will be presented by Mr. B. B. Adams, associate editor of the *Railroad Gazette*.

St. Louis Railway Club.

A regular meeting of the St. Louis Railway Club will be held at the Southern Hotel on Friday, May 10, at 3 p. m., at which time a number of papers answering matters taken up in the "Question Box Department," together with new questions submitted, will be read and discussed.

Central Railway Club.

The next regular meeting of the Central Railway Club will be held at the Hotel Iroquois, Buffalo, N. Y., on Friday, May 10, at 2 p. m. The Executive Committee will meet at 12 o'clock noon for the consideration of such business as may require their attention in advance of the Club session.

The Executive Committee has selected the following subject on which a committee consisting of L. T. Canfield, H. F. Ball and James Macbeth are to prepare a report: "Development in Car Equipment when Double-Heading with the Heavy Type of Engines. What is the Measure of Economy?"

New York Railroad Club.

The next meeting of the New York Railroad Club will be held at the house of the American Society of Mechanical Engineers, 12 West Thirty-first street, on May 16. The paper will be by Mr. F. F. Gaines, Mechanical Engineer of the Lehigh Valley Railroad, on "Increasing the Revenue Trainload by the Use of Large Capacity Cars and Improvements in Construction and Maintenance of Details." It has been arranged to give greater room for the audience by keeping the doors open between the auditorium proper and the parlor and providing camp stools. In two ways this will be a mercy to those in attendance. First, it will enable a good many people to sit down who have recently had to stand; and second, it will probably subdue some of the uproar heretofore maintained in the outer room.

Engineers' Club of St. Louis.

The 526th meeting was held at 1600 Locust street, May 1, at 8.20 p. m., Vice-President Kinealy presiding; twenty members and five visitors present. The subject of the evening was an account by Mr. Flad of his recent trip to Europe, illustrated by lantern slides. Among the views shown were many of the different filtration plants which he visited, some of these plants being in successful operation and some in process of construction, all of which were described in more or less detail. The following committee on prizes was announced: B. H. Colby, chairman; J. A. Ockerson, Carl Gayler, W. A. Layman, E. R. Fish.

The chair announced as the subject of the next meeting a paper by Mr. Duncan F. Cameron on "Coal Supply of St. Louis and Adjacent Territory."

PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. W. J. Footner, Vice-President and General Manager of the Great Northern Express Company, died from apoplexy at his home in St. Paul, Minn., May 4.

—Mr. John Player, Superintendent of Machinery of the Atchison, Topeka & Santa Fe, returned to Topeka on May 1, after a prolonged visit to San Bernardino, Cal., where he had been recovering from illness.

—Mr. F. B. Harriman, Superintendent of the Dubuque Division of the Illinois Central, was born Dec. 23, 1861, at Nora, Ill. He entered the service of this company as an apprentice in 1879, to learn civil engineering and was promoted in 1883 to assistant roadmaster. Mr. Harriman was connected with the Chicago, Madison & Northern as an engineer during the location and construction of the road. He was appointed Assistant Engineer of Construction on the Cherokee & Dakota, in 1887, and the next year became Road Supervisor on the Illinois Central.

—Mr. D. S. Gallagher, recently appointed Superintendent of Transportation of the Houston East & West Texas, was born in Harmar, Ohio, Nov. 10, 1857. He began his railroad career as an agent and operator on the Galveston, Houston & Henderson, serving in this capacity for two years. He was then transferred to Harrisburg, Texas, as ticket agent and operator for this company and the Galveston, Harrisburg & San Antonio. Mr. Gallagher became Commercial Agent for the Houston East & West Texas in 1896, being transferred in 1900 to the position of Trainmaster.

—Mr. Henry P. Timmerman, whose appointment as General Superintendent of the Ontario Division of the Canadian Pacific we noted last week, was born at Odessa, Ont., November 6, 1856. After receiving a common school education he entered railroad service in 1872, as an operator on the Grand Trunk. Mr. Timmerman was at one time connected with the Canadian Pacific as Train Dispatcher and Assistant Superintendent, and when the New Brunswick Railway was absorbed by the Canadian Pacific in 1890, he became General Superintendent of the Atlantic Division of the latter company at St. John, N. B.

—Mr. M. E. Staples, General Agent of the Erie Railroad at New York, died suddenly from paralysis at his home in Jersey City, May 4. He was born in New York in 1850. He began railroad work in the west in 1870 as a brakeman and two years later began working for the Erie. He was a station agent for several years and from that was promoted to Superintendent of Floating Equipment. He was appointed General Agent in 1887, in charge of all the freight terminals and harbor transportation of the company. Mr. Staples took an active interest in all matters relating to the improvement of New York Harbor and was a member of the National Board of Steam Navigation. Mr. H. E. Gilpin, heretofore Superintendent of the New York, Susquehanna & Western, will succeed Mr. Staples as General Agent of the Erie.

—Mr. M. B. Casey, whose appointment as Superintendent of Car Service of the Delaware, Lackawanna & Western, we noted last week, was born in Louisville, Ky., Dec. 29, 1859, and became a clerk in the Union Freight Transfer Station in 1877. In 1886, he became Superintendent, continuing in this position until 1888, when the station was consolidated with the Louisville & Nashville's local freight depot. Mr. Casey remained with them until 1891, when he resigned to engage in other business. He returned to the railroad service in 1894, as clerk in the office of the Superintendent of Transportation of the Illinois Central, leaving this company in 1899, to become chief clerk with J. M. Daly,

then Superintendent of Transportation of the Delaware, Lackawanna & Western.

—Mr. William Whyte, Assistant to the President of the Canadian Pacific at Winnipeg, is 58 years old. He was born in Scotland, and entered railroad service in 1862, as station agent. The following year he went with the Grand Trunk as brakeman, and passed through the various grades, finally becoming Division Superintendent. Mr. Whyte was General Superintendent of the Credit Valley, and in 1884 was appointed General Superintendent of the Ontario Division of the Canadian Pacific, which embraced all lines in Ontario west of Smith's Falls Junction, Ont. The next year his jurisdiction was extended over the Eastern Division. Mr. Whyte became Manager of the western lines in 1897, which position he held until his recent appointment as Assistant to the President.

—Brig. Gen. George L. Gillespie, Corps of Engineers, U. S. Army, whose appointment as Chief Engineer was noted last week, was appointed to the Military Academy in 1858 from Tennessee, and graduated second in the class of 1862, being assigned to the Corps of Engineers. He served through the Civil War, most of his earlier service being with the Army of the Potomac. He was twice brevetted for gallant services, and did most important work in building pontoon bridges and in the construction of other engineering works in the field. Since the Civil War General Gillespie has been engaged in much important engineering work, as a member of a number of boards, including the one to consider and report upon the harbor lines of New York harbor. He was also a member of the Lighthouse Board, and President of the Mississippi River Commission.

—Mr. Thomas Tait, the new Manager of Transportation of the Canadian Pacific, was born at Melbourne, P. Q., July 24, 1864. Mr. Tait entered railroad service in 1880 as a clerk in the Audit office of the Grand Trunk. The next year he took a similar position on the Chicago & Grand Trunk, but very shortly afterwards returned to the Grand Trunk. In October, 1882, he was appointed private secretary to the Vice-President and General Manager of the Canadian Pacific. This position he held until 1886, when he became Chief Clerk to the General Traffic Manager. He then became Assistant Superintendent, then Superintendent of the Ontario Division, then again General Superintendent of the Ontario & Quebec Division, and in March, 1893, he became Assistant General Manager. Four years later he was appointed Manager of the Eastern lines, same company.

—Mr. Charles D. Purdon, Chief Engineer of the St. Louis & San Francisco, is a native of Ireland, having been born at Belfast in 1850. He entered the Intercolonial Railway of Canada in 1870 as an axeman and assistant engineer, and remained with this company two years, at the end of which time he became Assistant Engineer of the Public Works Department of Canada, on surveys, St. Lawrence River. In 1880 he was appointed Assistant Engineer of the Texas & St. Louis, five years later becoming Chief Engineer of the Little Rock & Fort Smith. Mr. Purdon was for one year (1887-1888) Assistant Chief Engineer of the St. Louis, Arkansas & Texas. He then became Resident and Division Engineer of the Louisville & Nashville, and in 1890 went to the Atchison, Topeka & Santa Fe as Bridge Engineer, then Resident Engineer and Principal Assistant Engineer, finally becoming Assistant Chief Engineer. Mr. Purdon assumed his new duties on May 1, last.

—Mr. A. J. Hitt, General Manager of the Chicago, Rock Island & Pacific, is a native of Illinois, having been born at Ottawa, Jan. 31, 1849. He entered railroad service in 1870, and was consecutively, until 1872, brakeman, switchman, yardmaster and conductor of the Indianapolis & St. Louis. From 1872 to 1881 he was conductor and general yardmaster of the Marietta & Cincinnati. Then for eleven years he was with the Minneapolis & St. Louis as general yardmaster and assistant trainmaster, and in April, 1892, was appointed Superintendent of the Eastern Division of the Chicago, Rock Island & Pacific at Horton, Kan. The following year he became Assistant General Superintendent of the lines west of the Missouri River, which position he held until August, 1895, when he became General Superintendent of the entire system. Mr. Hitt was General Superintendent of the lines east of the Missouri River from May 1, until Oct. 1, 1899, when he again became General Superintendent of the system.

—We are now at liberty to announce that Mr. S. P. Bush, Superintendent of Motive Power of the Chicago, Milwaukee & St. Paul, will leave the service of that road about May 30 to become General Manager of the Buckeye Malleable Iron & Coupler Co., Columbus, Ohio. A little over a year ago Mr. Bush went to the St. Paul from the Pennsylvania Lines, Southwest System. On the latter road he served since 1884 as special apprentice in shop and foundry work, as draftsman, assistant engineer of the motive power department, Master Mechanic at the Columbus shops, and from March, 1893, to the end of 1899, as Superintendent of Motive Power of the Southwest System. Mr. Bush is a graduate of Stevens Institute and is now 37 years old. His advancement has been rapid. He has reached the front rank of motive power men and has made an enviable reputation for himself in the Master Car Builders' and Master Mechanics' Association. When such men as Mr. Bush leave the service of railroads to enter commercial work, we cannot help a feeling of regret that the railroads allow these men to get away from them. It is well known that many of the best of the young men coming out of the technical schools are being taken by manufacturing and engineering companies and now those same interests are beginning to absorb the pick of the experienced motive power men.

ELECTIONS AND APPOINTMENTS.

Arkansas & Louisiana.—J. M. Herbert has been appointed General Superintendent, with headquarters at St. Louis, Mo., succeeding E. A. Peck, resigned.

Atlantic Coast Line.—T. H. Symington, Superintendent of Motive Power, has resigned.

Atchison, Topeka & Santa Fe.—A. W. Towsley, Superintendent of Transportation, has resigned. (See Seaboard Air Line.)

Atkinson Niobrara River.—The officers of this company, referred to in the Construction column, are: President, D. P. McMayhoney, Charter Oak, Iowa; Vice-President, T. A. Harris, Omaha, Neb.; Secretary, Geo. W. Poynter, Omaha; Treasurer, D. O. Johnson, Charter Oak; General Attorney, Frank T. Ransom, Omaha, A. O.

Perry is President of the Perry-Harris Construction Company.

Bay of Quinte.—C. A. Millener, in addition to his duties as Auditor, has been appointed Acting Secretary and Treasurer.

Canton-Akron.—The officers of this company, referred to in the Construction column, are: President, William H. Hoover, Canton, Ohio.; Vice-President, Aaron Wagner, Akron; Treasurer, P. L. Saltonstall, Boston, Mass.; Secretary, Chas. A. Kolp, Canton; General Manager, L. E. Meyers, Chicago.

Central of New Jersey.—J. Lowrie Bell, General Traffic Manager, has resigned, effective July 1.

Chicago & Alton.—The headquarters of C. J. Fellows, Superintendent of Car Service, have been removed from Bloomington, Ill., to Chicago, Ill.

Chicago & Northwestern.—Owing to ill health W. B. Causey, Assistant Division Superintendent, with headquarters at Milwaukee, Wis., has resigned.

Chicago, Lake Shore & Eastern.—R. B. Campbell has been appointed General Manager, with headquarters at Joliet, Ill., and R. A. Dugan becomes Assistant to the President, and Purchasing Agent, with headquarters in the Rookery Building, Chicago, of this company and the Elgin, Joliet & Eastern. The position of Assistant General Manager has been abolished. Effective May 1, F. E. Learned has been appointed Traffic Manager.

Chicago, Milwaukee & St. Paul.—S. P. Bush, Superintendent of Motive Power, with headquarters at West Milwaukee, Wis., has resigned.

Cincinnati Northern.—F. C. Whipple, Assistant General Freight and Passenger Agent, has resigned and that position is abolished.

Erie.—H. C. Hooker has been appointed Secretary to the President and G. A. Richardson becomes an expert on Transportation. Both these gentlemen were formerly connected with the Baltimore & Ohio. H. E. Gilpin, heretofore Superintendent of the New York, Susquehanna & Western, has been appointed General Agent of the Erie, succeeding the late Mr. Staples.

Grand Central Station.—Lawrence Griffith, heretofore Supervisor of Track, has been appointed Assistant Manager.

Great Northern.—A. E. Taber has been appointed Master Mechanic, with headquarters at Great Falls, Mont., succeeding J. McGie.

Gulf & Ship Island.—J. B. Hatch has been appointed Superintendent of Roadway. The position of Chief Engineer, formerly held by Mr. Hatch, has been abolished. J. F. Mahoney, Superintendent of Transportation, has resigned, effective May 1, and this position is also abolished.

Illinois Central.—On May 1, that portion of the line between Gilman and the north switch at Clinton, Ill., which has heretofore been operated as a part of the Springfield District, Springfield Division, was transferred to the Chicago Division, to be in charge of H. McCourt, Superintendent, with headquarters at Chicago. The Rantoul District of the Springfield Division, which was intended to be transferred to the Chicago Division, will remain under the jurisdiction of the Springfield Division, and the eastern terminus of the Omaha Division, designated as Mona Junction, has been changed to the west switch at Waterloo.

Indianapolis & Martinsville Rapid Transit.—The officers of this company, referred to in the Construction column last week (p. 307), are: President, Charles Finley Smith; Vice-President and Treasurer, Emmet H. Smith; Secretary, Amory T. Irwin.

Kansas City, Fort Scott & Memphis.—C. R. Rockwell has been appointed General Auditor, with headquarters at Boston, Mass.

Mexican Central.—The following new directors have been elected: John R. Davis, Mexico; John J. Mitchell, Chicago; Richard Olney, Boston; H. Clay Pierce, St. Louis; Frederick H. Prince, Boston; Eben Richards, St. Louis; C. D. Simpson, Scranton, Pa.; W. L. Stow, New York; J. C. Van Blarcom, St. Louis, and B. F. Yoakum, St. Louis. H. Clay Pierce has been elected Chairman of the Board.

Midland Terminal.—L. R. Ford, in addition to his duties as Secretary, Auditor and General Freight and Passenger Agent, will discharge those of Vice-President, succeeding B. P. Cheney, resigned.

Minnesota & Wisconsin.—The position of Traffic Manager and Purchasing Agent having been abolished, H. M. Pearce has been appointed General Freight Agent and T. W. Teasdale, General Passenger Agent; headquarters at St. Paul, Minn. W. Bennett has been appointed Superintendent, succeeding James Minogue, resigned.

Missouri, Kansas & Texas.—The New York offices of this company have been removed from 135 Broadway to 49 Wall street.

Missouri Pacific.—H. C. Draper, heretofore Assistant Engineer of the Chicago & Alton, has been appointed Resident Engineer in charge of construction of a branch line of the M. P.

Montpelier & Wells River.—A. W. Prescott has been appointed Auditor and Cashier, with headquarters at Montpelier, Vt.

Plant System.—J. F. Enright has been transferred to Montgomery, Ala., as Master Mechanic of the Fourth Division, relieving W. H. Dyer, who has been transferred to Brunswick, Ga., as Master Mechanic of the Second Division, relieving S. M. Roberts, who, in turn, succeeds Mr. Enright as Master Mechanic of the Third Division, at Waycross, Ga., effective May 1.

Richmond Street & Interurban.—The officers of this company, referred to in the Construction column, are: President, Henry B. Smith, Hartford City, Ind.; Vice-President, John W. VanDyke, Lima, Ohio; Secretary and Treasurer, Chas. Murdock, Lafayette, Ind.; Assistant Secretary, John M. Lontz, Richmond, Ind.; General Attorneys, Stuart, Hammond & Sims, Lafayette.

Rutland.—S. R. Callaway was elected a director at a meeting held April 24.

St. Joseph & Grand Island.—W. N. Marshall has been appointed Assistant General Freight Agent.

St. Louis Southwestern.—W. H. Weeks has been appointed General Passenger Agent of the St. Louis Southwestern of Texas, succeeding J. F. Lehane,

Seaboard Air Line.—A. W. Towsley, heretofore Superintendent of Transportation of the Atchison, Topeka & Santa Fe, has been appointed Assistant to J. M. Barr, Vice-President and General Manager of the S. A. L.

South Carolina & Georgia Extension.—P. H. Freeman has been appointed Acting Auditor, succeeding H. J. Bruce, Auditor.

Toledo, St. Louis & Western.—B. R. Stephens has been appointed Superintendent of Transportation, a position recently created, with headquarters at Frankfort, Ind., and will report to the President and General Manager. The position of General Superintendent has been abolished, effective May 1.

Union Pacific.—Zachary T. Sprigg has been appointed Master Mechanic of the Colorado Division, with headquarters at Denver, Colo., and William R. McKeen, Jr., becomes Master Mechanic of the Wyoming Division, at Cheyenne, Wyo., succeeding J. H. Manning, resigned, effective May 1.

Wheeling & Lake Erie.—At a meeting recently held the following new directors were elected: E. Gould, J. Ramsey, W. S. Pierce, C. J. Lawrence and G. J. Gould.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ALTON, EDWARDSVILLE & EAST ST. LOUIS.—This company has been incorporated in Illinois, with a capital stock of \$2,500, to build a railroad from East St. Louis via Alton to Edwardsville. The incorporators are: Elliott W. Midge and James E. Flynn, of Edwardsville; J. W. Scott, E. H. Buente and Theodore Selb, of Venice.

ATKINSON NIobrARA RIVER.—Grading is completed for 23 miles on this line from Atkinson, Neb., north 25 miles to Perry. The Perry-Harris Construction Co., Omaha, Neb., has the contract for building and equipping. The road is narrow gage and will use 48-lb. relay rails and is to be completed Aug. 1. (Atkinson & Niobrara, April 5, p. 245.) The officers are given under Elections and Appointments. (Official.)

BLUE RIDGE & ATLANTIC.—Surveys are in progress and grading is to be begun, about June 1, on this line which is practically an extension of the Tallulah Falls, from Tallulah Falls, Ga., south 40 miles via Clayton and Rabun Gap, Ga., and Otto, N. C., to Franklin. J. A. Reynolds is Assistant Chief Engineer, and S. C. Dunlap, General Manager, both of Clarkesville, Ga.

BUFFALO, EAST OTTO & CATTARAUGUS.—This company was incorporated in New York, May 1, with a capital stock of \$800,000, to build an electric road 35 miles long from Cattaraugus to Hamburg or Buffalo. The directors are: U. L. Upson, of Orchard Park; L. F. Boies, W. J. Hayes, of Buffalo; H. L. Moench, S. F. Burger and W. A. Oakes, of Cattaraugus; J. Otto Hamelle, O. S. Laing and C. H. Mason, of East Otto, and Theodore P. Truby, of Otto.

CALIFORNIA PACIFIC.—This company has been incorporated in California, with a capital stock of \$1,000,000, to build a railroad from Los Angeles south to San Pedro, to be operated by steam or electricity. The directors are: E. E. Milliken, H. V. Davis, Thos. J. Hook, M. B. Hook and W. S. Hook.

CANTON-AKRON.—Surveys are completed and building begun on this electric line from Canton, Ohio, north 25 miles via New Berlin, Greentown, Uniontown, Britain and North Springfield to Akron, paralleling the Cleveland Terminal & Valley line of the Baltimore & Ohio. The L. E. Myers Co. has the contract for building and equipping, including buildings and machinery. (May 3, p. 307.) The officers are given under Elections and Appointments. (Official.)

CAROLINA NORTHERN.—Building is in progress on the extension from Barnesville, N. C., south 27.5 miles to Marion, S. C. T. C. McNeely, of Lumberton, N. C., is General Superintendent. (Construction Supplement, March 8, 1901.)

CENTRAL TRACTION.—This company has been incorporated in Indiana, with a capital stock of \$200,000, to build an electric railroad from Indianapolis east through Greenfield, Knightstown, Connorsville and Liberty to Richmond and the State line. The directors are: Frank Maus Fauve, John W. Chipman, Logan Scholl, Ansel Fatout and Emil C. Kassman.

CHICAGO & NORTHWESTERN.—The company will build a spur in the Menomonee Valley, at Milwaukee, Wis. Arrangements are completed with the Chicago, Milwaukee & St. Paul for the use of portions of its tracks and a line will be built from a point on the Madison Division just west of the city limits to connect with the St. Paul near the stockyards.

CHICAGO, MILWAUKEE & ST. PAUL.—Surveys are reported in progress for an extension of the Mankato-Wells branch from Mankato, Minn., north about 50 miles through St. Peter and along the west side of the river to Benton Junction. Another route projected is from Mankato northeast about 60 miles through Cleveland and LeSuer Center to Farmington.

Surveys are reported begun for an extension of the Schulz spur above Merrill, Wis., to Trout City on Prairie River, five miles.

Surveys have been made for a branch from Waukon, Iowa, to iron ore deposits, 5¾ miles.

CHICAGO, ROCK ISLAND & PACIFIC.—An officer denies that contracts have been let, as reported, for the cut-off between Brighton and Perlee, in Jefferson County, Iowa. (April 26, p. 292.)

COLUMBUS, DELAWARE & NORTHERN INTERURBAN.—See Railroad News column.

CONESVILLE & CAMBRIDGE.—This company was incorporated in Ohio, May 3, with a capital stock of \$25,000, to build a steam railroad from near Conesville, Coschocton County, connecting the Wheeling & Lake Erie and the Pittsburgh, Cincinnati, Chicago & St. Louis in the Township of Franklin, and having its terminus in the city of Cambridge in Guernsey County. The incorporators are: J. W. Hanly, Willis Vickey, F. B. Garrett, M. E. Hendryx and C. S. Bentley.

DAYTON, GERMANTOWN, HAMILTON & CINCINNATI ELECTRIC.—Surveys are reported completed as far as Middletown, Ohio, for this electric line from Dayton south through Middletown, Germantown and Hamilton to Cincinnati. It is stated that contracts will be let at once for grading on the Dayton end of the line. J. O. Arnold, of Dayton, is President, and T. C. Lindsay, Secretary.

DENISON, BONHAM & NEW ORLEANS.—The U. S. Construction Co. has taken the contract for grading, masonry, bridges, track laying, etc., on this line from Denison, Tex., south to Bonham. The section is to be completed before Aug. 1. C. M. Hurley, of Fort Worth, is President.

DETROIT, UTICA & ROMEO ELECTRIC.—Application has been made for right of way from Romeo, Mich., for an extension of this company's electric line which now runs from Mount Elliott avenue, in Detroit, north seven miles to Center Line. It is proposed to extend it on through Utica to Romeo.

EASTERN OF ALABAMA.—Incorporation has been filed with the Secretary of State of Alabama to build from Talladega east about 25 miles to Lineville, Clay County. The capital stock is \$250,000. The incorporators are: W. H. Boynton, Cecil Browne, E. H. Dwyer and G. A. Mattison, of Talladega; W. B. Smith, R. B. Parker and J. W. Knowles.

FORT WAYNE, DAYTON & CINCINNATI TRACTION.—This company has been organized and right of way obtained for an electric line connecting the cities of Fort Wayne, Ind., and Dayton and Cincinnati, Ohio. President, Dr. Samuel F. George, Dayton, Ohio; Secretary, Chas. W. Gebhart, Dayton; General Superintendent, A. J. Miller, Dayton; Superintendent of Construction, W. H. Pulse, Carrollton, Ohio; Engineer, Ira Hodgson, Dayton.

HANCOCK & CALUMET.—Building is reported begun on changing from narrow to standard gage this line in the North Peninsula of Michigan.

INDIANA ROADS.—The Kerlin Bros. Co., 705 The Nasby, Toledo, Ohio, write that they are interested in a proposed electric line from Montpelier, Ind., to run west 22 miles to Marion, with a branch from a point about five miles west of Montpelier to run due south into Hartford City, in all about 30 miles. Franchises are secured in the city of Montpelier and considerable right of way is obtained between Montpelier and Marion, and franchises have been asked for in Hartford. The company has not yet been organized, nor has its name been determined.

JACKSON, COLUMBUS & NORTHEASTERN.—President I. C. Enoch and General S. S. Bullis, former President of the Gulf & Ship Island, are making a trip over the proposed route of this line, with a view to going forward with building soon. It is projected from Jackson, Miss., northeast about 100 miles up Pearl River, and via Macon to Columbus. (Construction Supplement, March 8, 1901.)

JACKSONVILLE MIDLAND.—This company has been incorporated in Illinois, with a capital stock of \$22,000, to build a railroad in Morgan County from Jacksonville northwest 10 miles to Concord. The principal office is Jacksonville. The incorporators are: J. H. Hackett, John A. Ayers, Charles S. Rannels, E. S. Greenleaf and Edward P. Kirby, all of Jacksonville, Ill.

KANSAS CITY SOUTHERN.—An officer writes that contracts have been let for approximately 30,000 cu. yds. of masonry for improvements on the line between Kansas City and Port Arthur, as recently noted. (April 26, p. 292.)

LACKAWANNA & WYOMING VALLEY RAPID TRANSIT.—The Transit Contract Co., Room 520, Connell Bldg., Scranton, Pa., controlled by John R. Lee, of Paterson, N. J., has the contract for building this electric line from Scranton, Pa., southwest via Moosic, Avoca and Pittston to Wilkesbarre. It is to be completed by Sept. 1. Mr. Lee will sublet if not all the work. The work is heavy rock and earth grading and heavy masonry. The maximum grades will not exceed 4 per cent., and the maximum curves 2 deg. F. W. Mattis, of Scranton, is Chief Engineer.

LOUISIANA ROADS.—H. G. Broussard, of Loreauville, is reported interested in a railroad being built from Shell Lake to a point in Iberia Parish through timber lands, 15 miles.

LOUISVILLE & NASHVILLE.—Deeds have been filed for right of way at Selma, Ala., for the Selma & Pensacola branch from Selma to Sardis. This is taken to mean that this section is to be built as soon as the steel bridge contracted for across the Alabama River has been built, and that L. & N. trains will then enter Selma over their own tracks instead of those of the Western of Alabama from Gulf Junction.

MANITOULIN & NORTH SHORE.—Tenders will be received, up to May 11, for building the section from a point on the north channel of the Georgian Bay to the falls of Spanish River at the site of the Spanish River Pulp & Paper Co., 16¼ miles. Plans, profiles and specifications may be seen at the office of the Chief Engineer, Sault Ste. Marie, Ont. The road is projected from the terminus of the Grand Trunk at Meaford, Ont., to run northwest through Owen Sound, Wiarton and the Bruce Peninsula to the harbor near Tobermory, thence by ferry 15 miles to Fitzwilliam Island; thence across Manitoulin Island to the mainland and northwest to a connection with the Algoma Central, with a spur to Sudbury. (April 12, p. 259.)

MIDDLEBRANCH & CANTON BELT.—This company has been incorporated in Ohio, with a capital stock of \$15,000, to build a line from a point on the Cleveland Division of the Wheeling & Lake Erie, in Lake Township, Stark County, to run south through the city of Canton to a point on the Carrollton Division of the same road in Canton Township. The incorporators are: Chas. W. French, Z. W. Davis, H. B. Stewart, V. A. Dehnell, J. Whiting, Jr., L. A. Loichot and Edward Langenback. (See South Canton Belt Line below.)

MUSKOGEE & WESTERN.—This company has been incorporated in Oklahoma, with a capital stock of \$2,000,000, to build a railroad from Fort Gibson, Ind. T., west about 160 miles to El Reno, Okla. T. The principal office is El Reno, Okla. T. The incorporators are: Chas. Haskell, Ottawa, Ohio; Chas. H. Duffy, New York; Wm. T. Hutchings, Muskogee; Wm. Grimes and D. F. Smith, Kingfisher, Okla. T.

NEW YORK, NEW HAVEN & HARTFORD.—An officer writes that he knows of no extension contemplated by his company to Clayton, Mass., as referred to last week (p. 308).

A bill has been favorably reported in the Connecticut Legislature permitting the company to abandon its tracks along the Connecticut River at Hartford and to enter the city from another point. The probable intention is to build a new bridge across the Connecticut.

NORTH CAROLINA ROADS.—The McMullen-Miller Lum-

ber Co. is reported building a railroad from Bowden's to Newton Grove, 17 miles. W. H. McMullen, of Minneapolis, Minn., is General Manager.

NORTHERN MICHIGAN.—This company has been incorporated in Michigan, with a capital stock of \$1,000,000, to build a railroad from Sault Ste. Marie about 60 miles through the counties of Chippewa and Mackinac to St. Ignace. The stockholders are: Byron Boyden, G. W. Cobb, W. W. Grinstead, Samuel Topliff, S. E. Peel, F. S. Boyden and W. R. Betham, all of Chicago.

NORTHERN PACIFIC.—An officer writes that surveys are in progress for a possible extension of the Gaylord & Ruby Valley line from Twin Bridges, Mont., southeast about 20 miles to Alder Gulch. Building is not yet authorized. (April 26, p. 292.)

OKLAHOMA CENTRAL & SOUTHEASTERN.—This company has been incorporated in Oklahoma, with a capital stock of \$1,500,000, to build a railroad from Kiowa, Kan., southeast about 200 miles through Oklahoma to Colegate, Ind. T. The principal office is Enid, Okla. The incorporators are: Edmond Frantz, O. J. Fleming, John B. Lindem, C. E. Hunter, W. O. Cromwell, H. E. Havens and John W. Riley.

PACIFIC & IDAHO NORTHERN.—Building will be resumed, according to report, in a few days on this line, from Council Valley, Idaho, to the Seven Devils mining country. Chas. D. Moore, of Weiser, Idaho, is Chief Engineer. (Construction Supplement, March 8, 1901.)

PAWPAW.—A contract is reported let for eight miles of this line from Fairmont, W. Va., on the Baltimore & Ohio, north 12 miles to Fairview. Ex-Gov. A. B. Fleming, of Fairmont, is among the incorporators. (Construction Supplement, March 8, 1901.)

PENINSULA TRACTION.—Building is reported begun at Chesapeake City, Md., on a section of this electric line, which is projected from Wilmington, Del., southwest 32 miles, via Newark, Delaware, Elkton and Chesapeake City, Md., to the Chesapeake Bay at Northeast; also from Wilmington south 130 miles via Chesapeake City, Cecilton, Middletown, Delaware, Bombay Hook, Smyrna, Dover, Medford to Rehoboth Beach on the Atlantic Coast. About 45 miles of old road will be included.

PEORIA & SPRINGFIELD.—This company has been incorporated in Illinois, with a capital stock of \$2,000,000, to build a railroad from Peoria, Ill., south about 55 miles to Springfield. The principal office is Chicago. The incorporators are also connected with the Peoria & St. Louis, which has been for some years building between the two points named. They are: Dwight L. Wing and Turney English, of Springfield, Ill.; Thomas W. Kenyon, of Athens, Ill.; Tompkins C. Delevan, of New York City, N. Y.; and Myer Shamburg, of Philadelphia, Pa. (Peoria & St. Louis, Construction Supplement, March 8, 1901.)

PITTSBURGH, BINGHAMTON & EASTERN.—Building is reported begun at Binghamton, N. Y., on the section from that city to connect with the western extension of the Barclay. Anton Hardt, of Wellsboro, Pa., is Chief Engineer. (Construction Supplement, March 8, 1901.)

PITTSBURGH, JOHNSTOWN, EBENSBURG & EASTERN.—Contracts will be awarded in a few days at Philadelphia, according to report, for an extension from Dougherty, Pa., to Frugality. (Construction Supplement, March 8, 1901.)

PITTSBURGH, MCKEESPORT & CONNELLSVILLE.—Building is reported nearly completed on this electric line which is to run from Pittsburgh, Pa., south through Buena Vista, West Newton, Ruffsdales, Tarr, Scottdale and Everson to Connelleville, with branches from Connelleville to Uniontown, Masontown and the Monongahela River. The detailed report shows that the line is completed as far as Buena Vista and is to be ready for operation about June 10 to West Newton, and that building is well advanced at other points along the line. (Construction Supplement, March 8, 1901.) Wm. H. Graham, of Pittsburgh, is President, and Geo. I. Whitney, Treasurer.

RICE LAKE & NORTHERN.—Twenty miles of road is located and building in progress on this line from Rice Lake, Wis., via Burch Lake to Ashland, about 100 miles. (March 29, p. 230.) Geo. Fuller, of St. Paul, Minn., is President; Geo. M. Huss, of Rice Lake, Wis., Vice-President and General Manager, and J. E. Horsman, Rice Lake, Secretary. (Official.)

RICHMOND STREET & INTERURBAN.—This company was incorporated in Indiana, May 1, with a capital stock of \$500,000, to build an electric railroad from Indianapolis, via Dublin, to Richmond. The officers are given under Elections and Appointments.

ROCKFORD-JANESVILLE ELECTRIC.—The city of Beloit, Wis., has granted right of way for this electric line from Rockford, Ill., through Beloit to Janesville. H. H. Clough, of Rockford, is President.

SANTA FE, PRESCOTT & PHOENIX.—Building is reported in progress on a cut-off 23 miles long south of Ash Fork, Ariz., which will eliminate 39 wooden trestles, change the maximum grade from 3 per cent. to 1.5 per cent., and reduce the distance to Prescott by three miles.

SOUTH CANTON BELT LINE.—This company was incorporated in Ohio, May 2, with a capital stock of \$10,000, to build a railroad from a point on the Carrollton Division of the Wheeling & Lake Erie in Canton Township, via the City of Canton, west to a point on the Cleveland Division of the Wheeling & Lake Erie, and thence north to a point on the Pittsburgh, Fort Wayne & Chicago, in Canton Township. Among the incorporators is Chas. W. French, President of the Richland & Mahoning, Mansfield, Ohio.

SOUTHERN.—An officer writes that he has no advice that the company intends to make a further extension from Gamble's Store, Tenn., of three miles. (May 3, p. 308.)

Building is reported begun on extensive improvements on the Evansville Division, including stone ballasting.

SOUTHERN INDIANA.—Materials are reported being shipped to Jasonville, Ind., for a branch from that city to the Sullivan County coal fields.

SOUTHERN MISSOURI & ARKANSAS.—The Arkansas R. R. Co. is building a line for this company from Mingo, Mo., southwest 36 miles via Poplar Bluff to the Arkansas State line. It has been surveyed as far as Poplar Bluff. K. H. Killebrew & Co., of Mingo, Mo., or Cape Girardeau, have the contract for grading. Bridges will be furnished by the Phoenix Bridge Co., and directed by the railroad. About three miles of graduation is completed and 10 to 12 miles of right of way cleared. The work to Poplar Bluff is light, but there is some heavy work in the city of Poplar Bluff. The maximum grade

is two-tenths of 1 per cent.; the maximum curve 5 deg. Twenty miles of rails have been contracted for with the Illinois Steel Co., and equipment has been contracted for with the American Car & Foundry Co. (April 26, p. 291.) The officers of the Arkansas R. R. Co. are: President, E. F. Blomeyer; Chief Engineer, S. E. Coomes, Cape Girardeau, Mo.; Newman Erb, of 66 Broadway, New York, is the eastern representative. (Official.)

TOLEDO TERMINAL.—C. H. Sawyer is reported to have taken the contract for this line at Toledo. Thomas H. Tracy is President of the Toledo Railway & Construction Co., which calls for the bids. (April 19, p. 276.)

TUG & GUYANDOTTE.—This company has been incorporated in West Virginia to build a railroad along the rivers named from Day Station, on the Norfolk & Western, through McDowell County to Baileyville. Among those interested are Charles Welland, Philadelphia, and Samuel L. Flournoy, Charleston, W. Va.

UNION TRACTION OF INDIANA.—Surveys are reported in progress for an extension of this electric line from Marion, Ind., west 12 miles to Converse. The company now owns an electric line from Indianapolis north to Marion.

WABASH VALLEY.—This electric line has asked right of way through Terre Haute, Ind., for its proposed line from that city south down the valley of the Wabash through Vigo and Sullivan counties. According to the contract grading must be begun within 12 months. S. R. Hammill, of Terre Haute, is Attorney. (Construction Supplement, March 8, 1901.)

WASHINGTON-BALTIMORE ELECTRIC.—Organization has been effected at Cleveland, according to report, on this proposed electric line from Washington, D. C., to Baltimore, 33 miles, with a branch of 15 miles to Annapolis. Lamprecht Bros. & Co., of Cleveland, are interested.

WEST VIRGINIA ROADS.—The Stevens Oil Co., of Titusville, Pa., is reported building a line 15 miles from Norton, W. Va., on the Norfolk & Western, to Pound Gap, near the Kentucky line.

WHEELING & LAKE ERIE.—See Railroad News column.

GENERAL RAILROAD NEWS.

ARKANSAS MIDLAND.—This road, extending from Helena, Ark., to Clarendon, 50 miles, and from Pine City to Brinkley, 24 miles, is reported sold to representatives of the Gould roads.

ATCHISON, TOPEKA & SANTA FE.—The first dividend, being 1½ per cent., was declared on the common stock May 1, payable June 18, to stockholders of record May 28. This is understood to be a semi-annual distribution.

AVOYELLES.—The Texas & Pacific has issued a circular stating that it has acquired the Avooyelles line from Bunkie, La., to Simmesport, 26 miles, and from Longbridge to Marksville, 10 miles, possession being taken May 1.

BUFFALO & SUSQUEHANNA.—Arrangement has been made with Fisk & Robinson, to refund the company's outstanding 5 per cent. bonds of 1913, into first mortgage refunding 4 per cent. 50-year gold bonds. Of the total \$1,470,000 issue, \$491,000 has been retired through the sinking fund, leaving outstanding, on April 1, \$979,000. The offer to exchange has already been accepted by holders of a considerable amount of bonds. (April 12, p. 260.)

CHICAGO, BURLINGTON & QUINCY.—The sum of \$294,410 has been set aside to buy Nebraska Extension 4 per cent. bonds, due May 1, 1927, at not to exceed 110 and accrued interest. Proposals will be received up to May 15 at 12 o'clock noon, by the New England Trust Co., trustee, Boston, Mass.

CHOCTAW, OKLAHOMA & GULF.—The directors, on May 3, authorized the issue of \$2,000,000 common stock to be approved at a special meeting of the stockholders, to be held on July 9. The increase is to provide for the extension to Amarillo, Tex.

COAHUILA & PACIFIC.—The Noel-Young Bond & Stock Co., of St. Louis, Mo., is offering at \$6.33 and interest, \$200,000 of the \$2,500,000 first mortgage 5 per cent. gold bonds. These are issued at the rate of \$12,000 per mile on the line now building. The road, as projected, is about 200 miles long, and 80 miles is completed and 20 miles more is to be finished by June 1. It is to run from Saltillo, Mex., on the Mexican National, to Torreon, junction point of the Mexican Central and the Mexican International. It has been granted concessions from the Federal and State Governments which include free importation of material and rolling stock, 30 years' exemption from all State or municipal taxes and free use of water; also a subsidy of \$752,000 6 per cent. gold bonds from the State of Coahuila. (Dec. 28, 1900, p. 868.)

COLUMBUS, DELAWARE & NORTHERN INTERURBAN.—The company has filed articles in Ohio increasing its capital stock from \$10,000 to \$1,000,000, and has begun to build its line from a point near Columbus to Marion. It is stated that representatives of the Columbus, London & Springfield and the Springfield, Dayton & Urbana have been added to the boards of directors, and that the three lines will eventually be consolidated, making part of the proposed system between Cleveland and Cincinnati.

DENVER & RIO GRANDE.—Judge Brown, of New York, in the U. S. Circuit Court, has handed down a decree refusing permanent injunction and vacating the temporary injunction issued last week, in the action of Nathaniel W. Raphael restraining Spencer, Trask & Co. from carrying out the plans of consolidating the Denver & Rio Grande and the Rio Grande Western. (May 3, p. 308.)

DETROIT & NORTHWESTERN.—This electric line running from the City Hall, Detroit, northwest 38 miles, through Sand Hill, Clarenceville, Farmington, Northville, Orchard Lake, Pine Lake, Cass Lake and Sylvan Lake to Pontiac, has been bought by the Detroit United Ry. Co., which is controlled by the Everett-Moore Syndicate of Cleveland.

FULTON CHAIN.—Dr. W. Seward Webb has bought this line, three miles long, extending from Fulton Chain Station on the Mohawk & Malone to Old Forge in the Adirondacks. He has also bought the property of the Crosby Transportation (Steamship) Co.

GREAT NORTHERN.—An extra dividend of one-half of 1 per cent. was paid, May 1, from the earnings of the Lake Superior Co. (Limited), organized about a year

ago to own all the company's interests in the Great Northern Express Co., the Great Northern Elevator Co., the Sand Coulee Coal Co., and other outside organizations.

HOCKING VALLEY.—Forty-seven Columbus, Hocking Valley & Toledo car trust bonds, series A, have been drawn by lot for redemption at par and accrued interest, July 1, at the Atlantic Trust Co., New York. (Feb. 15, p. 120.)

HOUSTON & TEXAS CENTRAL.—First mortgage bonds for \$50,000 have been drawn by lot for redemption at 110 and interest on June 30. (Feb. 15, p. 120.)

MEXICAN CENTRAL.—At the annual meeting, on May 1, directors were elected representing the St. Louis & San Francisco and the El Paso & Northeastern and other new interests in the property. It is stated that the company will continue to be operated as an independent road. Mr. H. Clay Pierce, of St. Louis, who represents the new buyers, is to be made Chairman of the Board. Mr. Pierce makes the following statement as to the plans of the company:

The efforts of the new ownership will be directed to the physical betterment of the property and increasing its traffic through the development of the resources of Mexico. The Pacific coast line of the Mexican Central R. R., now under construction to Manzanillo, when completed, will become an important factor as a new transcontinental line and provide a new line via the important port of Tampico across Mexico to the United States' new Hawaiian and Philippine possessions and the Orient. The harbor of Manzanillo is one of the best natural harbors on the Pacific coast, and is now being improved at a large expense by the Mexican government. The line will be operated wholly independent and interchanging traffic with all of its connections at El Paso on equal terms, which connections are now the Texas & Pacific, Southern Pacific and Atchison, Topeka & Santa Fe Railway, and the Rock Island, which will have completed its line from Liberal, Kan., to a connection with the Mexican Central Railway at El Paso in conjunction with the El Paso & Northeastern Railway during this year.

MISSOURI, KANSAS & TEXAS.—Boonville R. R. Bridge Co. bonds to the par value of \$52,000, have been drawn for the sinking fund to be paid at the Union Trust Co., New York, interest to cease July 1.

MOUNT AIRY & EASTERN.—Judge James E. Boyd, in the U. S. District Court, at Greensboro, N. C., on May 4, appointed C. B. Keese, of Martinsville, Va., Receiver of this narrow gauge line which was completed about a year ago from Mount Airy, N. C., north into Virginia. (Construction Supplement, July 27, 1900.)

MOUNT ALTO.—This property was bought at foreclosure sale on April 27, by T. B. Kennedy, President of the Cumberland Valley, for \$75,000. The road extends from Waynesburg, Pa., to the junction of the Cumberland Valley, 17.9 miles, and is under lease to the Cumberland Valley.

NEW YORK CENTRAL & HUDSON RIVER.—The stockholders will vote, May 21, on the proposition to acquire by lease the Beech Creek Extension for a term of 999 years, from May 22.

NORFOLK & WESTERN.—The first dividend on the common stock since the reorganization in 1896, being 1 per cent., was declared May 2, payable June 30, to stockholders of June 4.

OMAHA & ST. LOUIS.—A decree was filed in the Federal Court at Council Bluffs, Iowa, May 2, in the case of the Guaranty Trust Co., New York, and Julius S. Welch, against this company and others, to foreclose a mortgage. The decree is signed by Judge Thayer, of the Circuit Court of St. Louis, and Judge McPherson, of the Circuit Court for the Southern District of Iowa, and gives judgment to the plaintiff for the principal and defaulted interest to date, making a total of \$2,553,312.96, and allows the defendants until 10 days from May 1 to pay the judgment. If the amount is not paid within the specified time the property will be sold by Special Master in Chancery at the depot of the company in Council Bluffs, Iowa, at a date to be fixed by the Master. In case of the sale, the upset price will be \$1,250,000, the purchaser being required to pay \$50,000 in cash or certified check at the time his bid is accepted. Robert H. Kern, of St. Louis, is appointed Special Master in Chancery. (Jan. 4, p. 16.)

PENNSYLVANIA.—Sunbury, Hazleton & Wilkesbarre first mortgage bonds of 1878, to the amount of \$14,500, have been drawn for payment at par and accrued interest June 1, at the Fidelity Insurance Trust & Safe Deposit Co., Philadelphia.

PITTSBURGH & WESTERN.—The U. S. Circuit Court at Pittsburgh, on April 30, authorized the Receiver to borrow from the Union National Bank of Pittsburgh the funds needed to meet the principal and interest of \$210,000 receivers' certificates now maturing, which were issued May 6, 1898. (Oct. 19, 1900, p. 696.)

SALEM.—This line, extending from Salem, Ohio, to Washingtonville, 6.92 miles, has been sold to Col. Myron T. Herrick, of Cleveland. The road was sold at foreclosure on March 1 last, to the Morton Trust Co., New York, for \$125,000. (March 22, p. 210.)

SEABOARD AIR LINE.—Meetings have been called for the following companies to act on consolidation with the parent company: Raleigh & Gaston; Raleigh & Augusta Air Line; Carolina Central; Georgia, Carolina & Northern; Seaboard Air Line Belt; Palmetto; Chesterfield & Kershaw; Southbound. (April 26, p. 292.)

VICKSBURG, SHREVEPORT & PACIFIC.—The Receiver has turned over this property to the officers of the Queen & Crescent, which was sold under foreclosure at Monroe, La., March 30, to representatives of the first mortgage bondholders. (April 5, p. 246.)

WHEELING & LAKE ERIE.—At the annual meeting at Cleveland, May 1, men connected with the Gould interests were named as directors. Joseph Ramsey, Jr., Vice-President and General Manager of the Wabash, announces that the Wheeling & Lake Erie will continue to be operated as a separate company, but that a close working arrangement will be made with the Wabash. He states that a short line will be built from Jewett, Ohio, on the Wheeling, to Steubenville, and from the latter point trackage rights have been secured over an existing line into Pittsburgh. This will obviate the building of a separate line and terminals into that city. (April 12, p. 260.)

YOUNGSTOWN-SHARON RAILWAY & LIGHT.—Battles, Heye & Harrison, of New York and Philadelphia, are offering at 102 and interest, \$1,000,000 of the \$2,500,000 first mortgage 5 per cent. 30-year sinking fund gold bonds. The company proposes to furnish electric railroad service between Youngstown and Hubbard, Ohio, and Sharon, Sharpville, South Sharon and Wheatland, Pa. (April 8, p. 104.)